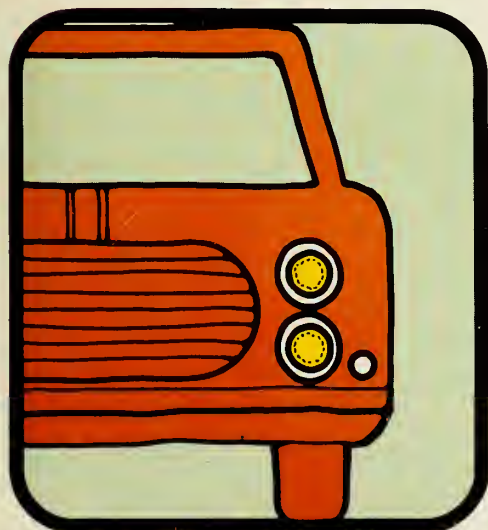
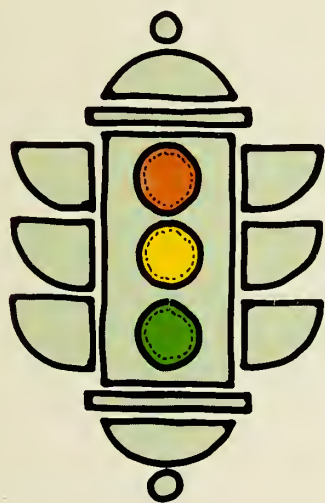


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Helena Transportation Plan

1981 Update



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March 30, 1982

James W. Hahn, Chief
Planning & Research Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, Montana 59620

Dear Mr. Hahn:

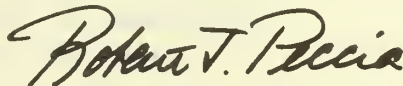
We are pleased to transmit to you 100 copies of the 1981 Update of the Helena Transportation Plan as per our agreement.

This project has been accomplished in close cooperation with the Transportation Plan Update Ad-Hoc Committee and the Helena Transportation Policy Coordinating Committee. These committees are composed of representatives of the City of Helena, Lewis and Clark County, the Lewis and Clark Areawide Planning Organization, the Montana Department of Highways, and the Federal Highway Administration. In addition to review by these committees, the Transportation Plan Update has also been extensively reviewed by the public. We believe the reviews have resulted in a transportation plan that best reflects Helena's transportation needs within the limitations of financial resources.

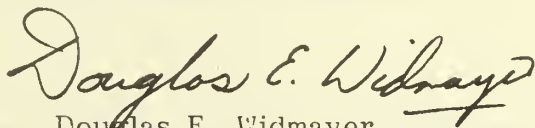
We have sincerely enjoyed our participation in this project and would like to thank the Department of Highways for offering us this opportunity. We would also like to express our appreciation for the guidance and support provided by your staff and the Ad-Hoc Transportation Coordinating Committee.

Yours very truly,

ROBERT PECCIA & ASSOCIATES



Robert J. Peccia
President



Douglas E. Widmayer
Project Engineer

DW/gp



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HELENA URBAN TRANSPORTATION PLAN

1981 UPDATE

Prepared For The
City of Helena and
Lewis and Clark County
and
the Lewis and Clark Areawide Planning Organization

In Cooperation With The
Montana Department of Highways
Planning and Research Bureau

and
Department of Transportation
Federal Highway Administration

Prepared By
Robert Peccia & Associates
Helena, Montana
Adopted February 3, 1982
Helena Transportation Coordinating Committee

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Federal Highway Administration or the Montana Department of Highways.

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CHAPTER I

INTRODUCTION & BACKGROUND

A. DESCRIPTION AND PURPOSE

This transportation plan update contains an investigation and analysis of the transportation problems that exist within the Helena Urban Transportation Planning Area and recommendations for improvements that will relieve or reduce these problems as well as providing for future needs. The intent of a transportation plan is to develop a program of improvements for the major streets within a community, integrated with other elements of a community's transportation system including bikeways, bus transit and other means of transportation. As a part of the transportation planning process, a major street network has been established and a recommended improvement plan prepared. Transportation problems that occur on streets not in the major street network are the responsibility of local agencies and are not included as part of the transportation plan.

The types of improvements included in this plan fall into two categories: 1) network improvements; and 2) transportation system management improvements. Network improvements are generally defined as consisting of a significant improvement or modification to the major street network, and involving substantial construction and cost. Transportation system management improvements are intended to maximize the use of existing facilities and generally are improvements to traffic operations involving little or no construction and relatively low cost. These improvement types are more fully explained in Chapters IV and V.

B. PROJECT BACKGROUND

The Helena Urban Transportation Plan Update is a cooperative effort of the the City of Helena, Lewis and Clark County, the Lewis and Clark Areawide Planning Organization, the Helena Transportation Coordinating Committee, the Montana Department of Highways, and the Federal Highway Administration. The project was funded primarily by Department of Highways Urban Transportation Planning Funds with some contribution by the Areawide Planning Organization.

Initial work including socio-economic projections, establishment of a traffic assignment model with base and future year traffic assignments, accident records, and other background studies were done by the Department of Highways and the Areawide Planning Organization. In December of 1980, due to limited manpower the Department of Highways retained the consulting firm of Robert Peccia & Associates of Helena to assist in completing the Transportation Plan.

The Consultant was guided through the performance of the study by an Ad-Hoc Transportation Technical Committee. This committee consists of technically qualified local, state and federal representatives who were appointed by the Helena Transportation Coordinating Committee to provide technical guidance to the Consultant during the preparation of the Transportation Plan Update.

The Ad-Hoc Committee reports to the Transportation Coordinating Committee, which is the decision-making body for transportation-related matters in the Helena area. This committee is comprised of two members from the Helena City Commission, two members from the Lewis & Clark County Commission, one member from the Department of Highways, one non-voting member from the Federal Highway Administration, and the Chairman of the Lewis and Clark Areawide Planning Organization (non-voting).

C. TRANSPORTATION GOALS

In the initial stages of the development of the Transportation Plan Update, a plan of study was prepared by an Ad-Hoc Transportation Task Force comprised of various City representatives and citizen members. Included in this plan of study that was prepared in June 1977 were goals and objectives that were established for the transportation planning process. These goals and objectives are as follows:

GOALS & OBJECTIVES OF THE PLANNING PROCESS¹

Principal Goal: to provide an institutional mechanism that will provide the best transportation system for the City.

The plan should:

1. Identify current and future (10, 20 years) problems, needs and desires
2. Intensively inform and involve the public
3. Formulate broad ranges of alternatives
4. Evaluate social, environmental, and economic effects of alternatives
5. Consider all modes of transportation
6. Provide for implementation
7. Prioritize plan elements
8. Monitor the effectiveness of the plan
9. Provide for updating
10. Provide for public accountability in transportation decision-making

In doing the above, the plan must consider:

1. energy conservation
2. costs
3. public safety
4. system reliability
5. land use relationships
6. community identity
7. neighborhood integrity
8. effects on the business and industrial community
9. travel time and convenience
10. effects on community growth
11. relationship to special groups: handicapped
 elderly
 youth
 low-income
12. environmental quality
13. public enjoyment of transportation and urban experience

¹ Plan of Study for Update of Comprehensive Transportation Plan, City of Helena, June 20, 1977.

D. PREVIOUS STUDIES AND COMMITMENTS

This transportation plan update has been prepared using a vast amount of previous data that is pertinent to transportation planning in the Helena area. These data sources are previous studies relating to transportation that have been done, previous commitments for improvements that have been made, and documents that were prepared to specifically guide the preparation of the transportation plan update. A summary of the information used for the transportation plan update is as follows:

1. Previous Transportation Studies

HELENA URBAN TRANSPORTATION STUDY - 1970

A Comprehensive Urban Transportation Plan was prepared for the Helena area by the Planning and Research Bureau of the Montana Department of Highways in 1970. This study contains a comprehensive investigation of major transportation deficiencies, and recommendations for improvements. The intent of the 1981 Transportation Plan Update is to reflect those elements of the 1970 Transportation Plan that are still applicable, and update those sections that are no longer applicable or where conditions have changed and the plan is no longer valid.

INTERSTATE 15 CORRIDOR STUDY

The presence of a lightly used interstate highway prompted the initiation of a study to evaluate means of improving access to I-15 and investigate means of reducing traffic on adjacent facilities. This study was done by contract for the Montana Department of Highways and adopted by the Policy Coordinating Committee, the City of Helena, and Lewis & Clark County. The study results have also been recently reaffirmed by the Transportation Coordinating Committee.

HELENA TRANSIT DEVELOPMENT PLAN

A transit development plan that investigated the various alternatives and the feasibility of providing an expanded public transit system in Helena was prepared by the Lewis & Clark Areawide Planning Organization.

HELENA BIKEWAY PLAN

A bikeway plan for the City of Helena was prepared in 1978 by the Lewis & Clark Areawide Planning Organization. This plan recognizes the increased use of bicycles in Helena, and the need to provide a coordinated bikeway system in the city. To date, this plan has not been officially completed or adopted.

CRUSE AVENUE - NORTH LAST CHANCE GULCH DRAFT E.I.S.

A location study and draft Environmental Impact Statement on the Cruse Avenue and North Last Chance Gulch improvements were prepared in June, 1981. The Transportation Coordinating Committee adopted a recommended alternative on June 24, 1981, with DOH approval on February 8, 1982 and FHWA approval on February 15, 1982.

SOUTHEAST HELENA COMPREHENSIVE PLAN

An amendment to the City comprehensive plan outlining future development of Helena's southeast side was adopted in June, 1981. The plan amendment addressed transportation needs which were primarily based upon the location of an interstate interchange at Belt View Drive and Interstate 15. Other projects addressed were the extension of Belt View, Colonial, and Saddle Drives, and the addition of a new street beginning at Colonial Drive at the south end of the Belt View Interchange and extending southwest, linking to Saddle Drive.

2. Commitments for Major Improvements

CRUSE AVENUE - SIXTH TO ELEVENTH (M 5815-1)

This improvement consists of a northerly extension of Cruse Avenue from Sixth Avenue to a connection with Neill, North Main, and Helena Avenues. The recommended alignment and intersection configurations contained in the draft EIS for this project have been approved by the Helena City Commission and the Helena Transportation Coordinating Committee.

NORTH LAST CHANCE GULCH - NEILL TO LYNDAL (M 5807-1)

This project begins at the intersection of North Last Chance Gulch with Neill Avenue and extends northerly to the intersection of North Last Chance Gulch with Lyndale. This project has been included in the improvement program for Helena by the Montana Department of Highways.

NORTH LAST CHANCE GULCH - LYNDAL TO MONTANA (M 5807-2)

This project begins at the intersection of North Last Chance Gulch and Lyndale and extends northerly and easterly to the intersection of Montana and Cedar. This project has been programmed by the Montana Department of Highways.

HELENA WEST FOUR-LANE "EAST SECTION" (F - DP8-2(6)38)

This project consists of improving U.S. 12 from the Fort Harrison Road to the Blue Cloud Ranch to a four-lane highway. This project has been programmed for preliminary engineering, right-of-way and utilities by the Department of Highways.

3. Committed Transportation System Management Improvements

JOSLYN - EUCLID INTERSECTION (F8 - 2(21) 41)

A contract for signalization has been let for the Joslyn-Euclid intersection.

BENTON - EUCLID INTERSECTION

An overhead signing project is planned for the Benton-Euclid intersection. This project will be installed by City personnel.

4. Guidelines for Transportation Plan Update

PLAN OF STUDY FOR COMPREHENSIVE TRANSPORTATION PLAN UPDATE

In June, 1977 an Ad-Hoc Transportation Task Force appointed by the Helena City Commission prepared a plan of study for the Transportation Plan Update. The purpose of the plan of study was to guide the preparation of the Transportation Plan Update and determine the major work elements to be considered.

URBAN TRANSPORTATION PLAN UPDATE - TECHNICAL MEMORANDUM NO. 1

In April of 1980, the Urban Planning Section, Planning and Research Bureau of the Department of Highways prepared a technical memorandum describing the work accomplished and decisions made to that date. This memorandum documents some changes to the study area boundary, traffic analysis zones, and major street network that differed from the 1970 Urban Transportation Study. Numerous other technical memoranda are on file with the Department of Highways documenting other phases of the plan update.

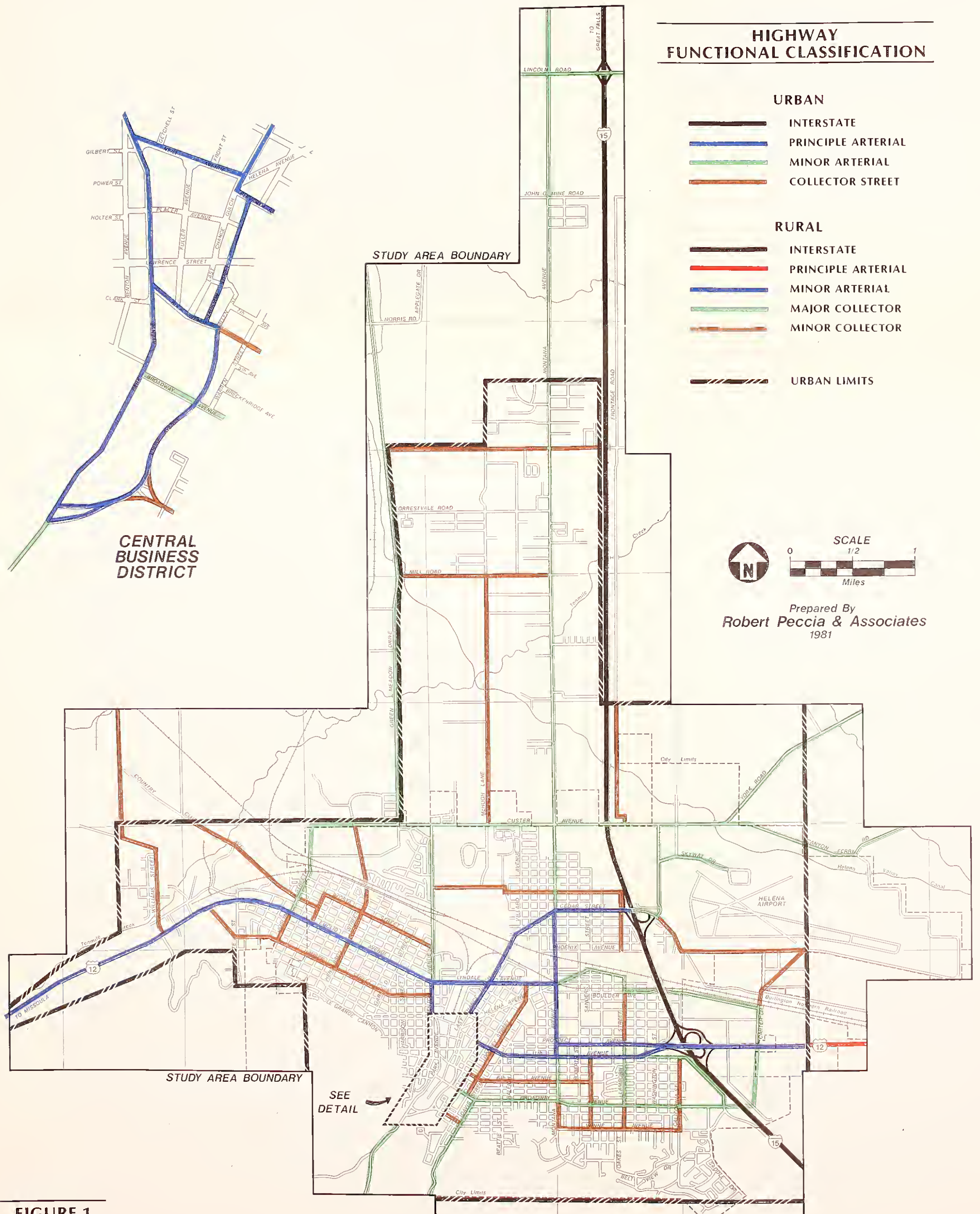
E. PUBLIC PARTICIPATION

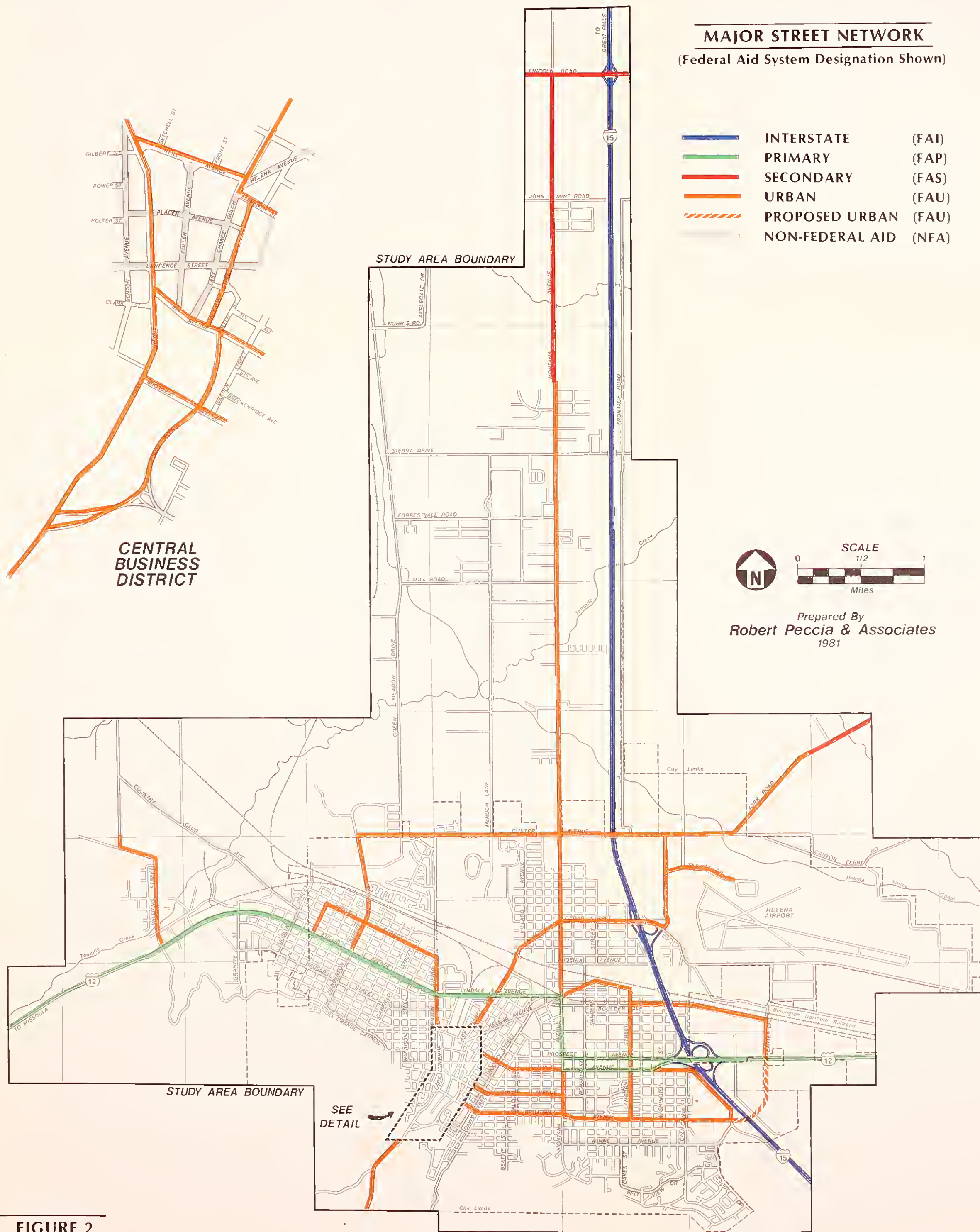
Since the inception of the plan, ongoing citizen participation and review has been an essential and important part of the planning process. Neighborhood meetings, meetings with the Helena Improvements Society (HIS), the Chamber of Commerce, and the Helena Citizens Committee (HCC) have been held regularly to seek input into the plans and to review various reports. A full record of these meetings and all public comments are on file with the Areawide Planning Organization.

F. MAJOR STREET NETWORK

A transportation plan is intended to address the major problems in a community that occur on the most important streets. An initial step in a transportation plan is to identify the most important streets and to designate a major street network. The criteria that were used to establish the major street network are as follows: 1) All roads and streets having a functional classification as a collector, arterial, or interstate were included as part of the major street network. 2) All roads and streets on a federal aid system were included in the major street network. 3) Other streets that provided a vital link in the street network were included as part of the major street network system.

The highway functional classification of all major streets within the study area is shown in Figure No. 1. This figure depicts the current use of the major streets within the network. Figure No. 2 shows the existing major street network classified according to Federal Aid funding systems designation.





G. FUTURE TRANSPORTATION PLANS

The development occurring in the southeastern portion of Helena has created interest in expanding the Helena area transportation system into Jefferson County. This area is currently outside of the transportation planning area for Helena, and these considerations are beyond the scope of this project. However, development pressures which are occurring in the area will require some additions to the Helena transportation system in the future. One of these improvements presently being considered is a southern arterial parkway located in northern Jefferson County. As development plans become defined, the Helena Area Transportation Plan will have to be modified to include these additions to the transportation system.

The Helena Valley is another area that is projected to grow steadily throughout the study period. As the valley develops, the transportation system should be expanded. At present, the portion of the valley that lies within the study area has only a skeleton street network system. The land use in this area is expected to change in the next few years from predominantly agricultural to residential. An established street network in this area prior to development would aid in creating a desirable traffic flow system. Several options available include extending Cooney Drive, Benton Avenue or Villard Avenue to the north. Creating several east-west connection links between Green Meadow Drive and Montana Avenue would also be desirable.

The entire street network should be reviewed periodically and modified when necessary to meet the traffic needs of this growing and changing community.

CHAPTER II

STUDY PROCESS & PROBLEM IDENTIFICATION

A. CURRENT TRANSPORTATION CONDITIONS

In general, the existing network of arterials and collector routes within the Helena area effectively provides for the vehicular-oriented transportation needs of the community. In comparison to many large urban areas in the nation, Helena experiences only minor congestion and delays during the peak demand periods. According to travel time analyses performed for this study, a motorist can travel from the outermost portion of the urban area to the heart of the Central Business District in less than 15 minutes.

Within this street network system, however, there are certain intersections and portions of roadway that disrupt the smooth flow of traffic, creating delays and potential hazards. Two major corridors carry a large portion of the city's traffic; Montana Avenue, which provides for north-south travel, and U.S. 12, which services east-west traffic. Many of the major intersections along these two corridors have capacity problems resulting in difficulty in moving across town in either a north-south or an east-west direction. There is also a certain amount of difficulty encountered in traveling from the Central Business District to the outlying business and residential areas. Last Chance Gulch, Helena, Eleventh, Broadway, and Benton avenues all provide access to the downtown area. During peak periods, these routes become congested and traffic moves slowly. Although the peak periods are relatively short in duration (30 minutes), the inconvenience and discomfort experienced by the motorist are significant.

Many of the traffic problems that occur within the study area are interrelated and require major improvements to the street network, while other problems are localized and require only minor adjustments to the existing system to achieve greater efficiency.

Through the studies and analyses described in this chapter, the major deficiencies in the transportation system have been identified. The recommended improvements outlined in this report are intended to provide relief to many problem locations while planning for the future transportation demands of the Helena area.

B. MASS TRANSIT FACILITIES

Several mass transit programs exist in the Helena area, providing a variety of services to the public. At present, there is no fixed route bus system within the study area; however, the city does operate a "Dial-A-Ride" bus program with three buses which are equipped to accommodate handicapped individuals. During the morning and evening rush hours, these buses are used for a home-to-work service.

There are two privately-owned bus companies, Intermountain Transportation Company and Rimrock Stage Company, providing intercity bus service to other cities in Montana and the Northwest. Helena also has two privately-owned cab companies which operate within the study area.

There is a special bus service in Helena operated exclusively for the elderly and the handicapped. This service, Rocky Mountain Transit, is provided by the Rocky Mountain Development Council with the assistance of the City.

The Department of Highways has also begun a van pool program for their employees using three 11-passenger vans (not including the driver). This program covers several routes and is heavily used by Department employees.

The mass transit systems operating within the study area are small and still in their infancy. The expansion of these services is expected to be slow but probable with the high cost of automotive transportation as an incentive to increased use of public transportation.

C. LAND USE

In the fall of 1977, as an initial step toward updating the Transportation Plan, the staff of the Lewis & Clark Areawide Planning Organization (APO) undertook a comprehensive land use inventory of all existing land uses within the city limits of Helena and immediate surrounding areas, including all of the east and west Helena Valley. This inventory served as a basis for making later projections of future land use development and for preparing socio-economic projections. These land use maps are available for use at the APO office in the Helena - Lewis & Clark City-County Building.

D. SOCIO-ECONOMIC STUDIES

As part of the transportation planning process, the APO was responsible for providing current and projected socio-economic data, including population and employment projections, for the study area for the years 1990 to 2000 by traffic analysis zones.

To accomplish this work element, the APO entered into a contract in the fall of 1977 with T.A.P., Inc., consultants from Bozeman, Montana, to inventory and analyze all socio-economic projections to the year 1990 and year 2000. The T.A.P. consultants completed this work in April, 1978.

However, the T.A.P. socio-economic projections were challenged by a group of local economists who thought that population projections in the T.A.P. report were overly optimistic and would lead to justification for overbuilding of roads within the Helena urban area. Accordingly, during late August and September, 1978 the APO Board appointed a special socio-economic committee comprised of local economists and citizens familiar with local area growth to revise the T.A.P. projections. In January, 1979 the socio-economic committee submitted revised population and employment projections which were adopted by the APO Board.

The existing and projected populations for the City of Helena and the Transportation Planning Area are listed in Table No. 1.

TABLE NO. 1
POPULATION ESTIMATES

	Base Year <u>1978</u>	<u>1990</u>	<u>2000</u>
City of Helena	23,938*	26,550	28,759
Transportation Study Area	30,479	39,640	44,288

* 1980 Census figure

It should be noted that although this report is the 1981 Update, the base year for socio-economic data and traffic projections is 1978.

E. TRAFFIC STUDIES

A number of traffic studies were done as part of the Helena Transportation Plan to determine the operational characteristics of the existing transportation facilities and to identify problem areas. The traffic studies that were conducted included the following:

1. Traffic Counts

The Montana Department of Highways conducts an extensive traffic counting program that provides valuable historical data on traffic volumes and characteristics. A permanent traffic counter located on Montana Avenue near Billings Avenue provides a continuous record of traffic flow on the most heavily traveled corridor in the transportation planning area. The Department also periodically counts traffic at 104 locations throughout the area. These records were used to establish current traffic volumes on the major street network.

In addition to these counts, the Consultant conducted manual intersection turning movement counts at 41 intersections. These counts were done to provide information on the operating characteristics and efficiency of these intersections.

2. Travel Time and Delays

An indication of problems occurring in traffic operations are unusually long delays or slow travel times. To identify locations where delays occur, a travel time and delay study was conducted in April, 1981. Travel speeds and delays on seven major travel routes were measured, displays showing average travel speeds and average intersection delays were prepared, and problem areas were identified. These displays are on file at the Montana Department of Highways.

The slowest average travel speeds occurred within the Central Business District. Last Chance Gulch, Jackson Street and Park Avenue operate at 10 to 20 mph. This reflects the function of these streets, which is to serve as access to the businesses in the downtown area. Some signs of congestion were noted on Benton Avenue and North Last Chance Gulch. Both of these major access routes to the C.B.D. operate at 15 to 20 mph, although they are signed for 25 mph. Broadway and Eleventh Avenue appear to operate smoothly at 20 to 25 mph. The Prospect and Eleventh one-way couplet operates from 20 to 30 mph with significantly slower speeds (14 mph) recorded on Montana Avenue in the vicinity of the couplet. It was also noted that the north-bound lane of Montana Avenue operates consistently 5 to 10 mph faster than the south-bound lane.

The most significant delays occurred at intersections on the U.S. 12 corridor. Standing delays in excess of 50 seconds were recorded on the north and south approaches to the Benton - Euclid intersection and on the south approach to the Main - Lyndale intersection. Delays as long as 59 seconds occurred on the approaches to the Montana - Helena - Lyndale intersection. The north approach to Montana and Prospect and the south approach to Eleventh and Montana tend to bottle-neck the traffic, which results in delays of 35 to 48 seconds.

In addition to the U.S. 12 corridor, delays in excess of 50 seconds were recorded on all approaches to the Helena - Neill - Main intersection.

3. Capacity Analysis

The ability of a street to carry traffic is known as the capacity of the street. In most cases the traffic capacity on urban streets is limited by the at-grade intersections.

A capacity analysis was done on all of the major intersections where capacity problems were suspected. These capacities were compared with existing and future traffic volumes to determine the level of service these intersections would provide over the 20-year planning period. At the conclusion of this study, the intersections that exhibited current or future capacity restrictions were considered to be deficient.

At the time of this study, several intersections were operating at capacity. The Benton-Euclid, Main-Lyndale, Lyndale-Helena-Montana, and Eleventh-Montana intersections all show signs of capacity limitations evidenced by long lines of backed-up vehicles and delays in excess of 50 seconds.

The analysis indicates that almost every signalized intersection on the U.S. 12 corridor and on Montana Avenue will have difficulty handling the projected traffic volumes for the year 2000.

4. Accident Investigations

Accident numbers and rates are an indication of the safety characteristics of a roadway. Locations where accidents occur may have awkward configurations or other problems that are a direct cause of accidents.

To identify areas with high accidents and to assess the probable causes of the accidents, an accident study was conducted. This study consisted of re-searching three years of accident records and preparing collision diagrams that showed the type of accident that occurred. If a location had more than six accidents in the three-year period, it was considered a high hazard location.

Most of the high accident intersections are located on the high volume corridors of U.S. 12 and Montana Avenue. The greatest number of accidents occurred within a one-block radius of the Lyndale-Helena-Montana intersection (53 accidents in three years). Two locations in the Helena Valley were identified as accident-prone; they are the Green Meadow Drive - Mill Road intersection and the York Road - Canyon Ferry Road intersection. The accident reports indicate that 9 of 13 accidents at these locations occurred at night and generally involved speed violations.

5. Roadway Condition Survey

A problem common to all communities is the deterioration of existing roadway surfaces and/or an inadequate roadway section. The major street network was inventoried and evaluated according to existing conditions and rated as good, fair, poor or very poor with specific problems of the roadway noted. The roadway condition survey was used to identify specific streets with surfacing problems.

The majority of the streets on the major street network are in good to fair condition. Many of the poor sections of pavement were localized to a one-block area, although several long sections of roadway were classified as being in poor condition. Montana Avenue from Lyndale to Custer, Green Meadow Drive and McHugh Drive were all classified as poor. The north portion of Benton Avenue from the Burlington Northern railroad tracks to Custer Avenue was the longest major road section classified as very poor. Portions of Jackson Street, Rodney Avenue and Railroad Avenue were also identified as having poor to very poor roadway condition.

F. TRAVEL FORECASTING

A traffic computer model based on the major street network was developed by the Department of Highways. The purpose of the transportation model was to provide a method of determining future traffic volumes based on the projected land use in defined traffic analysis zones.

Traffic projections using this computer model were made for the existing and committed major street network, and to test various network improvements. The 1980 traffic volumes and projected year 2000 traffic volumes for the existing and committed major street network are shown in Figures No. 3 and 4. The projected traffic volumes establish a relative relationship between systems and were used to determine the capability of the major street network to handle future traffic. Streets that were incapable of handling future traffic were designated as problem areas. These problem areas provide direction to the types of improvements that would be appropriate for improving Helena's transportation system.

G. TRANSPORTATION SYSTEM DEFICIENCIES

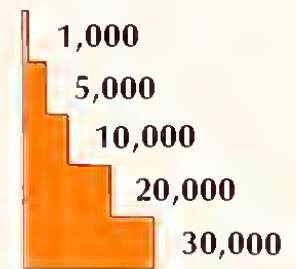
The traffic studies and other investigations into the Helena transportation system were done to identify the deficiencies in the system. Without a clear understanding of the deficiencies, a suitable improvement program would be difficult to develop. Transportation system deficiencies were classified into two types: 1) traffic operation deficiencies; and 2) street network deficiencies.

Traffic operation deficiencies are described as those deficiencies related to the efficient operation of traffic on the existing facilities or those that might be corrected with minor physical improvements to the system. For example, traffic signals and signs, pavement striping, channelization of traffic, parking problems, and minor physical problems might be corrected with only minor improvements.

Street network deficiencies, however, are characterized by problems that would require a significant change in the major street network such as adding a section to the major street network, widening or reconstructing a street, or changing the street configuration to the extent that traffic patterns would change.

The deficiencies that were noted during the traffic studies included street network continuity deficiencies, lack of access to the interstate system, streets that are nearing or will exceed capacity, high accident locations, excessive delays, and poor surface conditions. These deficiencies are shown on Figure No. 5, "Major Problem Areas".

YEAR 1980 TRAFFIC VOLUMES



VOLUMES REPRESENT ANNUAL
AVERAGE DAILY TRAFFIC



Prepared By
Robert Peccia & Associates
1981

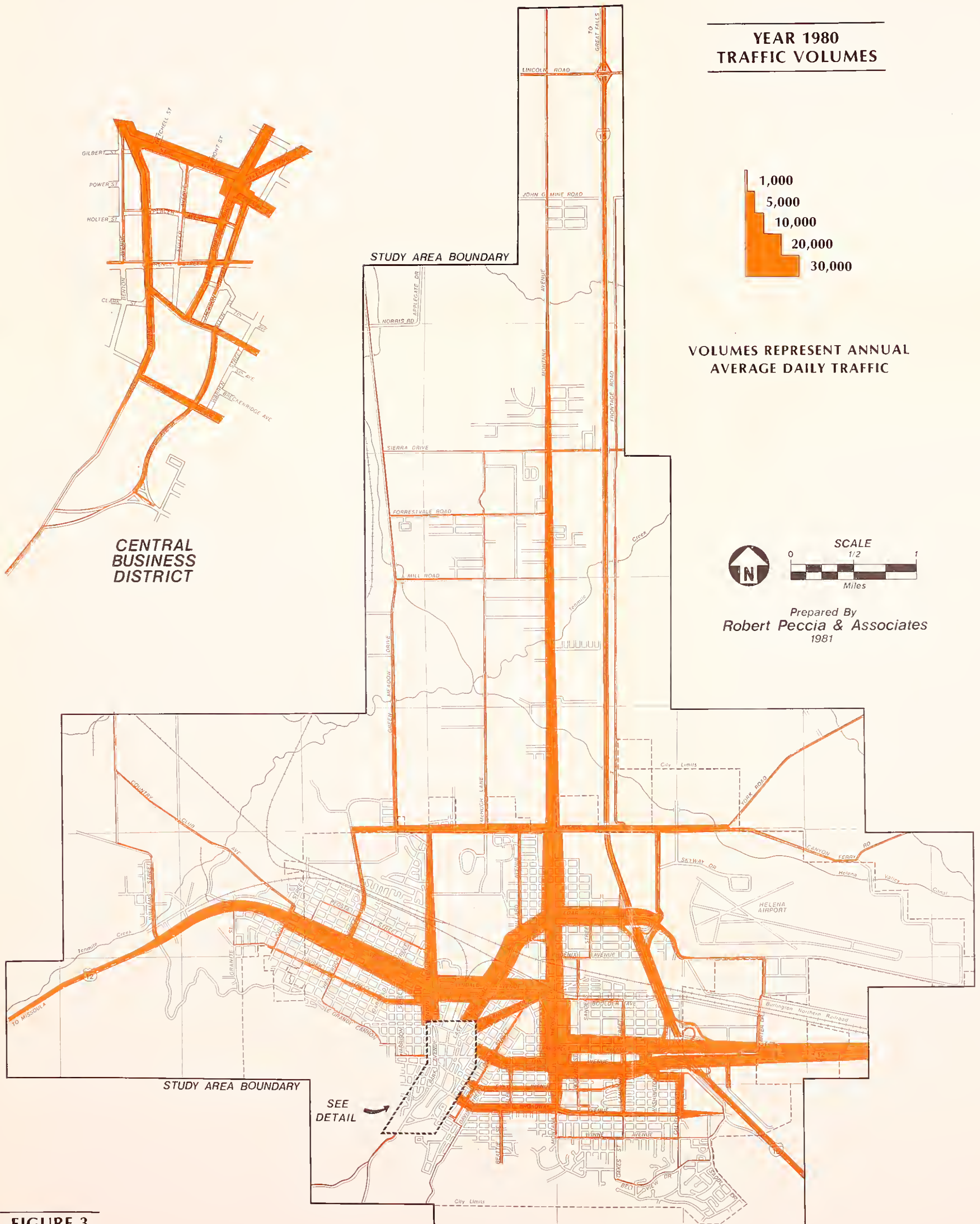


FIGURE 3

YEAR 2000 TRAFFIC VOLUMES

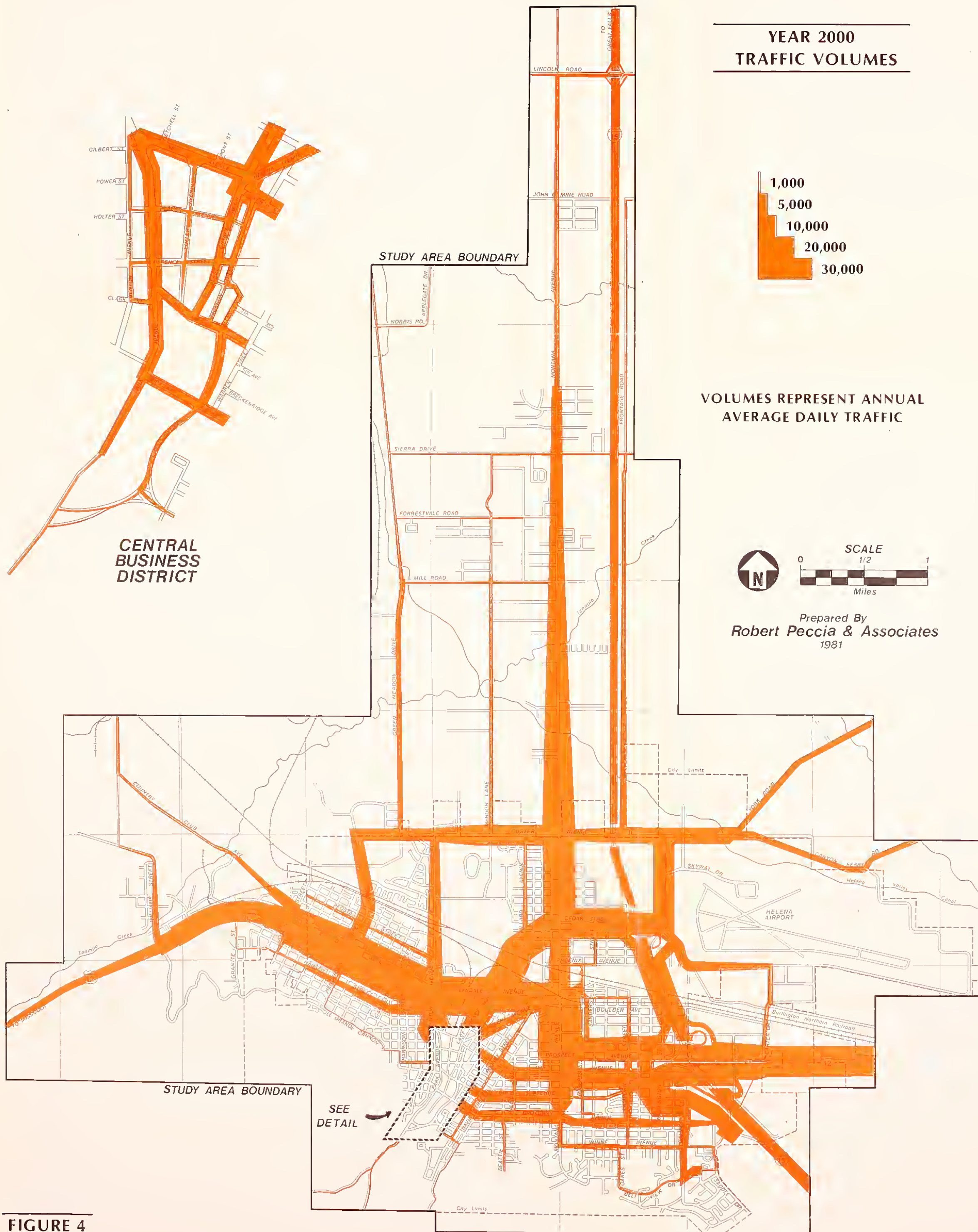
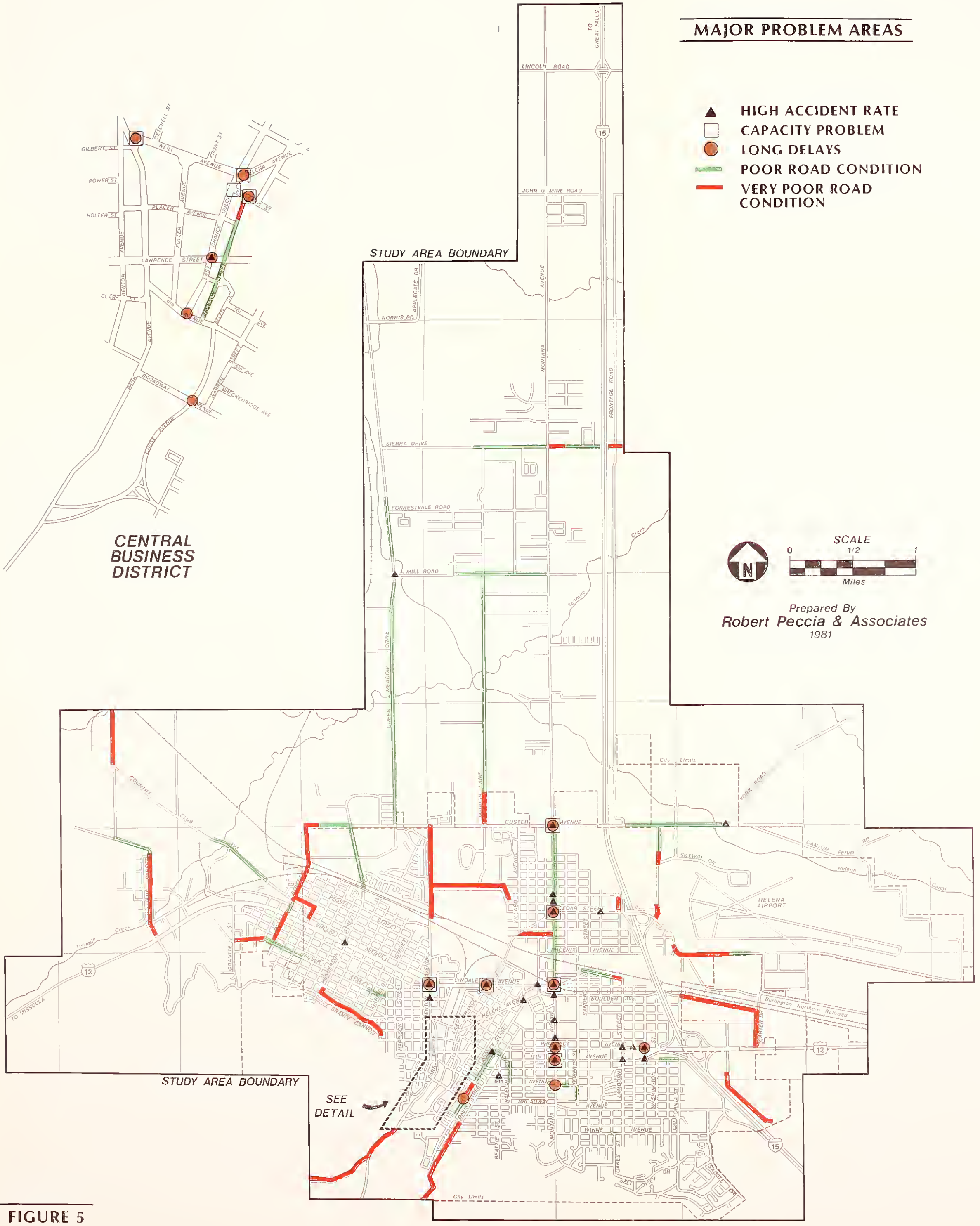


FIGURE 4



CHAPTER III

FINANCIAL PLAN

A. FUNDING SOURCES AND CATEGORIES

Sources of funds for highway transportation system improvements include federal, state, local, and private funds. A transportation plan is concerned with the major streets in a community, many of which fall on federal aid systems and which have traditionally been financed with the assistance of funding allocations from the federal and state governments. However, recent cutbacks in federal aid have changed this picture, and the trend in the future is that more and more of the financial burden for transportation system improvements will fall on state and local governments and private financial sources.

The funding categories which follow encompass the major sources that are available to the State of Montana at this time. Some categories which are inactive or which are specialized (Rail-Highway Crossing) are not directly applicable to this study since it is felt that they are too uncertain or detailed for a transportation plan. It should also be recognized that there are many changes occurring in the funding programs, and that the programs described may very shortly be obsolete or reorganized.

1. Interstate

Federal funds are apportioned each year for expenditures on projects for the completion of the interstate system. Each fiscal year, federal interstate funds are matched with state funds at the established matching ratio. These funds are then distributed to financial districts based on the ratio of cost of completing the interstate system in each financial district to the total cost of completing the interstate system in the state. Priorities for completing the interstate system are established by the Department of Highways with concurrence by the Highway Commission, and are approved by the Federal Highway Administration.

Since the interstate has been completed in the Helena urban area, there is little likelihood that any interstate funds will be available for any improvements recommended in this report.

2. Interstate Rehabilitation

Federal funds are now available for rehabilitation of the interstate system. The age and deteriorating condition of the interstate system has motivated the initiation of this relatively new program which is expected to replace much of the previous emphasis on construction of an interstate system with emphasis on

keeping the interstate system in good repair. Priorities for interstate rehabilitation projects are established by the Department of Highways with concurrence by the Highway Commission, and are approved by the Federal Highway Administration.

Congress is presently contemplating adding reconstruction to the existing interstate rehabilitation program. If this occurs, the additional funds could possibly be used for funding projects within the Helena urban area which would meet the funding criteria.

3. Primary

Federal funds are available under this program for projects on any approved primary route. Each fiscal year, federal funds are matched with state funds at the established matching ratio. These funds are then distributed to the twelve financial districts in the state, based on the ratio of the deficient primary mileage in each financial district to the total deficient mileage in the state. Priorities within each financial district on the primary system are established by the Department of Highways with the concurrence of the Highway Commission.

4. Rural Secondary

Federal funds are available under this program for projects on any approved secondary route. Federal rural secondary funds are matched with state funds at the established matching rate, and then distributed to counties and financial districts by an apportionment formula including factors such as land area, population, road mileage, and value of rural land. These funds are not available within Federal Aid Urban areas. Project priorities are established by the County Commissioners with concurrence by the Department of Highways.

5. Urban System

Federal funds are available under this program for projects on approved Federal Aid Urban routes in urban areas with populations over 5,000. Federal urban system funds are matched with state funds at the established matching ratio, and then distributed to cities having populations over 5,000 based on incorporated population figures. Project priorities under this program are established by local transportation policy committees or the responsible elected local officials.

6. Economic Growth Center

Federal funds allocated under this program are available for expenditures on any Federal Aid Route (except Interstate) that is located within an approved Economic Growth Center area of influence. Montana has four approved Growth

Centers: Helena, Kalispell, Colstrip, and Missoula (inactive). Funds are distributed to Growth Centers at the ratio of the miles of Primary, Secondary, and Urban System roads in need of upgrading in each Growth Center to the total miles of Primary, Secondary, and Urban System roads in need of upgrading in all the Growth Centers. Project priorities are determined by the Department of Highways with approval by the Federal Highway Administration.

7. Safer Off-System Roads

This program provided for funding of safety-related and other construction work on public roads not on a federal aid system. State matching funds are allocated to each county in the same method as secondary road funds. Project priorities are established by the County Commissioners with concurrence by the Department of Highways. The off-system program funds are currently frozen and it does not appear that any additional funds will be made available in the future.

8. Other Federal Programs

There are a number of other federal funding programs for roadway improvements including Forest Highway, Bridge Replacement, Rail-Highway Crossings, Pavement Markings, Hazard Elimination, and others. Most of these programs are specialized and constitute a small part of the total funding program. Since these programs fluctuate and are a small part of the overall funding, they are not included on the funding estimates.

9. Local Funds

In addition to federal and state funds, cities and counties provide funding for roadway maintenance and repair. Each year, state gasoline tax revenue funds are allocated to each city and county for use in maintaining and constructing roadways. Cities and counties also include mill levies in their general fund budgets for these improvements. In addition, local governments can resort to bond issues for specific improvements benefitting an identifiable group. Most of these funds, however, have been used on local streets in the past. Lately there has been much discussion about implementing a county-wide gas tax for local transportation improvements. Other funding options include tax increment financing and special improvement districts. A portion of the current city gas tax could be allocated to fund TSM improvements.

10. Private Funds

Many communities are now requiring private funding for roadway improvements that will benefit private interests. This is most noticeable in new subdivisions on local roads and streets. However, as federal funding becomes more

difficult to get, private interests may be induced to participate in improvements in major streets if some direct benefit to them can be demonstrated.

B. FUNDING ESTIMATES

Funding estimates by financial category were done from information provided by the Department of Highways Project Control Unit. These estimates were based on the funds available by category as of October 1, 1981 and allocated funds for fiscal years 1982 and 1983. The assumption was made that the 1983 funding amounts by category would remain constant throughout the 20-year planning period.

It is recognized that highway funding is being revised and is in a state of flux at this time. Insufficient information is available to provide any better estimates than the method described. However, the total amount of funding should remain somewhat stable even though categories may change. For instance, current emphasis is on completing construction of the interstate system, which is programmed to be completed in Montana in 1986. However, in the future it is expected that interstate rehabilitation will be emphasized. The best estimate that can be made at this time is that 1985 expected levels of funding will continue for the twenty-year planning period.

Table No. 2 shows the estimated funding levels for Federal Aid highway programs by the breakdown most appropriate for the funding category; i.e., financial district, urban area, county, or city.

This table does not include interstate funds since the interstate through Helena has been completed and it is unlikely that any interstate funds would be available to fund any of the transportation-related improvements recommended in this plan. However, the interstate funding system is in the process of being revised to emphasize interstate reconstruction, and in the future it may be possible that interstate-related improvements in the Helena area could be funded under the revised funding program. Since the nature of the program is uncertain as of the date of this study, this category has not been included as a possible funding source.

TABLE NO. 2
FEDERAL FUNDS AVAILABLE

	Primary* (FD #7)	Rural Secondary (L & C)	Urban System (Helena)	Econ. Growth Center (Helena)
Unobligated Balance (10/1/81)	\$6,136,214	\$1,116,494	\$2,514,301	\$421,199
Estimated Annual Allocations:				
1983	1,158,900	236,700	329,500	0
1984	1,236,300	236,700	329,500	0
1985-2001	1,236,300	236,700	329,500	0
Total: 1981-2001	\$29,548,514	\$5,613,794	\$8,774,801	\$421,199

* FD #7 includes Broadwater, Jefferson, and Lewis & Clark Counties. The portion of funds to be available for use by the Helena urban area is difficult to estimate at this time.

CHAPTER IV

TRANSPORTATION SYSTEM MANAGEMENT PLAN

A. METHODS AND PROCEDURES

Because of current economic conditions, many urbanized areas are finding it necessary to spend the majority of their limited local funds on maintenance improvements and are not able to fund major capital improvements. The transportation system management concept emphasizes the implementation of many small-scale localized improvements that result in noticeable improvement to the transportation system and are still within the municipalities' project limitations. It is anticipated that most of the TSM improvements will be funded out of local gas tax revenues. The local governing bodies may have to examine additional funding sources to fund all of the recommended TSM improvements.

Transportation system management improvements focus on maximizing the use of existing facilities through the use of minor alterations and/or operational changes. In many cases bottlenecks in the system limit the ability of the entire system to fulfill its transportation functions in an efficient manner. The intent of this transportation systems management plan is to remove these bottlenecks and provide a balanced transportation system utilizing existing facilities to the extent possible. The result should be a more smoothly operating transportation system.

A variety of traffic studies were done for this transportation plan as described in Chapter II of this report. These studies revealed a number of weaknesses in the system, and highlighted areas where minor improvements would improve traffic operations. On the basis of the results of these studies, operational improvements recommended in the 1970 Transportation Study, and assistance from City and County personnel knowledgeable about transportation problems in the area, a list of recommended transportation system management improvements was developed.

B. TRAFFIC SIGNAL SYSTEM EVALUATION

Recognizing that traffic signals are the major element of traffic control, a special study on traffic signals was done. Since this is an area where specific expertise is required, Ed Gossack, a traffic signal specialist from Oregon, was retained to assist in the signal system evaluation. The major findings of Mr. Gossack's analysis are as follows:

1. General Comments - Signalized Intersections

Generally, traffic moves quite well under current traffic volumes except for a few isolated problem areas. These problem areas are addressed in some detail in this section.

Following are some general comments which apply throughout:

- * Traffic signal detector loops are electronic circuits placed in the asphalt on intersection approaches. These detectors enable the signal to allocate "green time" according to actual traffic demand. Apparently, there are a number of traffic signal detectors which are inoperable. Proper detection combined with efficient time settings is extremely beneficial with regard to moving traffic effectively.
- * This logic also applies to signal coordinators and controllers. Money expended on proper maintenance is one of the cheapest "improvements" that can be made at existing signalized intersections.
- * Aggressive timing and optimization of existing equipment can result in increased capacities and improved traffic flow.
- * Whenever possible, wide intersection approaches should be provided to allow traffic to select proper lanes, and clear the intersection in the shortest possible time.

2. Traffic Signal System Operations

In a typical urban area, approximately two-thirds of all vehicle miles traveled are controlled by traffic signals. The efficient operation of traffic signals can therefore be a major factor in determining the quality of traffic flow.

A traffic signal system defines a group of signals on an arterial street or network of streets which have similar traffic flow characteristics and traffic demand requirements.

One method of improving traffic signal operation is to coordinate the operation of signals within a system. Coordinated operation requires installation of an interconnect circuit and a master controller. Typical signal systems provide coordinated operation plans for morning and afternoon peak hours, and off-peak hour traffic demands.

A good measure of traffic flow quality in an area is average travel time. The coordination of traffic signal operation in a system can reduce average travel time by as much as 10 to 12 percent.

The Helena area currently has 26 existing traffic signals. Six of the signals on the Prospect/Eleventh Avenue couplet, two of the signals on Montana Avenue, and five of the signals in the Central Business District are currently interconnected to allow coordinated operation. The remaining 13 signals are operating independently.

A survey of Helena shows four areas which have similar flow characteristics and which should be considered for coordinated signal system operation. These areas are discussed as follows:

EUCLID AVENUE - LYNDALe AVENUE

This corridor is the main east-west arterial for through traffic and provides access to the Central Business District from the west. The corridor has four existing traffic signals with a fifth signal proposed, and has an average spacing of 3,000 feet between signals.

MONTANA AVENUE

This corridor is the main link for east-west traffic between Lyndale Avenue and the Prospect/Eleventh Avenue couplet. It is also a major north-south arterial to the north of Helena. The corridor has six existing traffic signals with average spacings of 1,150 feet south of Lyndale Avenue and 3,300 feet north of Lyndale Avenue. The two signals at the south end of the corridor, Prospect Avenue and Eleventh Avenue, are currently interconnected for coordinated operation.

PROSPECT AVENUE - ELEVENTH AVENUE

This corridor is a one-way couplet which carries major east-west through traffic, as well as providing access to the Capitol Complex and the Central Business District from the east. The six existing signals in the corridor are interconnected for coordinated operation.

CENTRAL BUSINESS DISTRICT

This area has five existing traffic signals which control the flow of traffic in the central core area. The average spacing of the signals is 500 feet, and the signals are currently interconnected for coordinated operation.

The spacing of traffic signals is a major factor in the effective operation of a coordinated signal system. A general recommendation is to interconnect signals when average signal spacing is one-half mile or less.

Based on these recommended spacing guidelines, the existing signals on Montana Avenue south of Lyndale Avenue should be interconnected for coordinated operation.

The average signal spacings on Montana Avenue north of Lyndale and in the Euclid - Lyndale Avenue corridor currently do not warrant coordination of the existing traffic signal operations. However, serious consideration will have to be given to expanding the coordination system before any additional signals are installed in either of these corridors.

The expansion of the City of Helena that is expected to occur between now and the year 2000 will require additions to the traffic signal systems. Following is a list of suggestions and ideas for the orderly expansion of existing traffic signal system control:

- * Develop a master plan for future signal system requirements.
- * Replace worn-out and obsolete equipment with equipment compatible with system requirements.
- * Install interconnects for future as well as current use when street construction or utility relocation projects are underway.

- * Combine the operation of existing compatible systems to provide better area-wide traffic flow. The Prospect Avenue/Eleventh Avenue system should be combined with the Montana Avenue system.
- * Install local controllers that contain the required system coordination equipment at new traffic signal locations.

C. RECOMMENDED IMPROVEMENTS

The following section briefly summarizes the committed and recommended Transportation System Management (TSM) Improvements. The improvement numbers shown are for references purposes only, and do not indicate any priority or relative importance.

COMMITTED - EUCLID AND JOSLYN INTERSECTION

This intersection is to be fully signalized, and a construction contract was awarded in November, 1981 with an anticipated completion date in the summer of 1982.

COMMITTED - BENTON AND EUCLID INTERSECTION

An overhead lane use signing project has been programmed for the north approach of this intersection. It is anticipated that this project will be constructed in 1982.

TSM #1 - BENTON AND EUCLID INTERSECTION

This is a very high volume intersection that is operating at capacity during peak periods, resulting in extensive delays and backed up traffic on Benton Avenue. A total of 24 accidents occurred at this intersection in the last three years.

In an effort to improve the traffic flow and safety characteristics of the intersection, the following improvements are recommended.

- * Increase the curb turn radius on the southwest corner to 30 feet. Restripe the west approach to four 11-foot lanes
- * Restripe and re-sign the north approach to a left/straight lane and a right/straight lane
- * Remove the boulevard on south approach for 150 feet back from the intersection to provide for a three-lane approach; two exclusive 12-foot left-turn lanes and a 10-foot straight/right lane
- * Minor adjustments to detectors and signal phase length will be necessary
- * Add left-turn arrow indication for double left-turn lanes on south approach
- * No additional right-of-way will be required (see Figure No. 6)

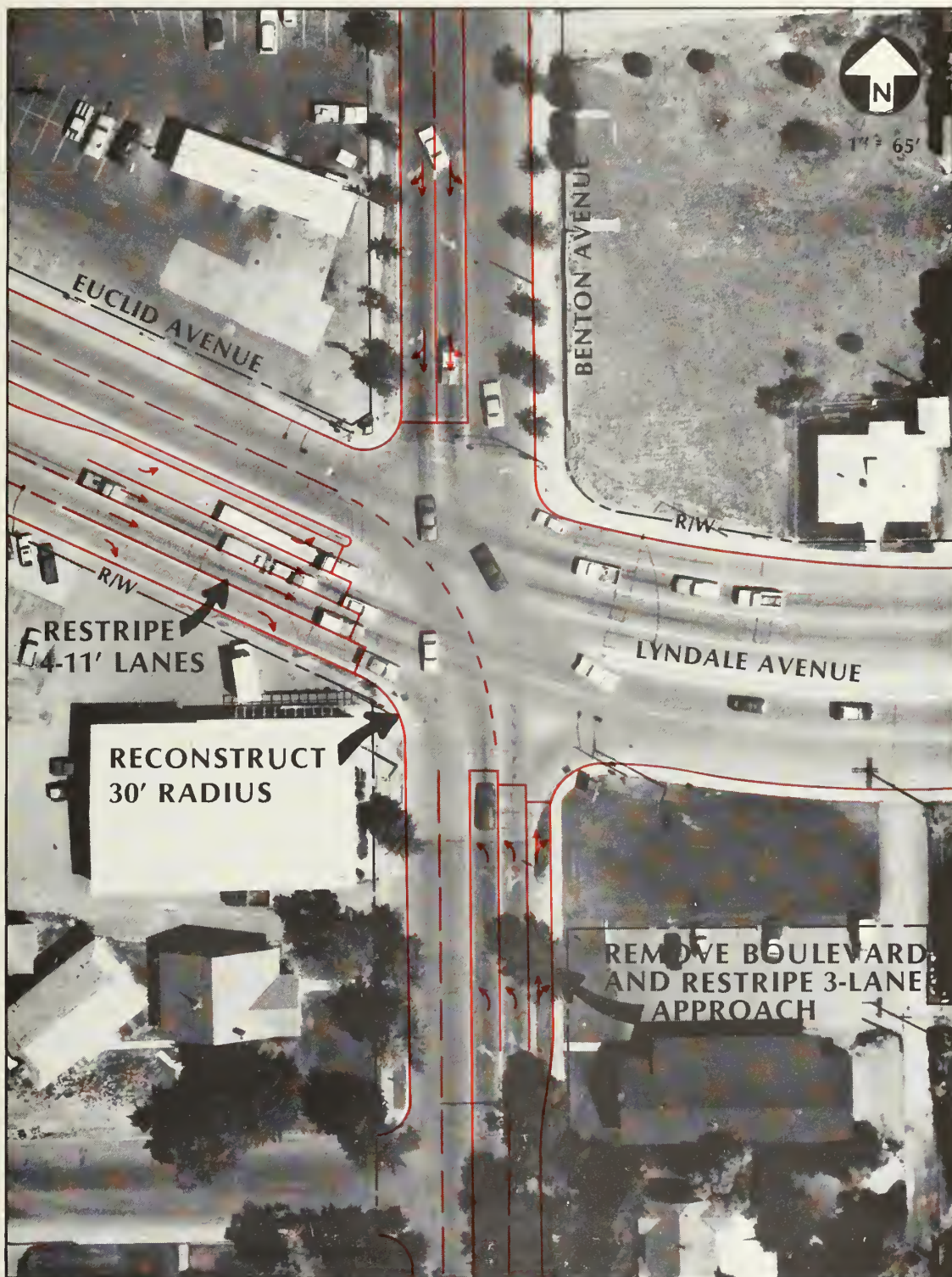


FIGURE 6 — T.S.M. IMPROVEMENT AT BENTON AND EUCLID

It should be noted that the programmed overhead signing project at this location will require modifications when the recommended improvements are implemented.

TSM #2 - BENTON AVENUE, NEILL TO EUCLID

This portion of Benton is required to service a large volume of vehicles. At present, a slow average travel speed (18 mph) restricts the traffic flow. Total usable pavement width is narrowed by the existence of parking lanes, although the amount of parking on Benton Avenue appears to be minimal.

This section should be signed for peak hour parking restrictions on weekdays. It is recommended that the west side of Benton Avenue be signed for no parking during the hours of 7:00 a.m. through 9:00 a.m., and the east side should be signed for no parking during the hours of 4:00 p.m. through 6:00 p.m.

TSM #3 - BENTON AVENUE, LESLIE TO EUCLID

In an effort to reduce delays and improve the flow characteristics at the Benton - Euclid intersection, the north approach should be restriped and re-signed to provide more use of the existing pavement width.

The west side of Benton from Leslie Avenue to the Euclid intersection should be signed for no parking and striped to provide two approach lanes.

TSM #4 - HAUSER AND BENTON INTERSECTION

Ten accidents have occurred at this location during the three-year study period. The accident reports indicate that side street traffic on Hauser has difficulty in entering the Benton corridor traffic. Parking in the vicinity of the intersection creates a congested situation and decreases the usable pavement width.

Parking on Hauser should be removed back from the corners a minimum of 60 feet. This improvement will increase the sight distance and provide additional space for turning movements.

TSM #5 - HENDERSON AND EUCLID INTERSECTION

A large number of pedestrians have been observed crossing mid-block in the vicinity of Henderson and Euclid. Adequate pedestrian facilities exist at the Henderson intersection, but are not being used. It is recommended that law enforcement be increased in the area. Pedestrian safety should also be emphasized in the school system, and a pupil safety study for the entire city should be initiated.

TSM #6 - BROADWAY AND LAST CHANCE MALL

Due to the large volume of pedestrian traffic crossing Broadway at this location, it is recommended that the pedestrian facilities in the vicinity be upgraded. Pedestrian crossing warning signs and extensive pavement striping should be provided at this location.

TSM #7 - SIXTH AND RODNEY INTERSECTION

The approach widths at this signalized intersection are greatly reduced by the presence of parking lanes. Many vehicles are observed having difficulty making turning movements at this location.

Parking should be prohibited within 75 feet of the corners on the north and south approaches on Rodney. This will provide the additional space required for turning movements and improve sight distances at this intersection.

TSM #8 - ELEVENTH AND RODNEY INTERSECTION

This intersection has a poor geometric configuration because of the alignment of Eleventh Avenue. This intersection would operate more efficiently if the approaches on Rodney were less congested and provided wider driving lanes for turning vehicles.

Parking should be prohibited within 75 feet of the corners on both the north and south approaches. This improvement will increase the sight distances and provide additional space for turning movements.

TSM #9 - RODNEY AND HELENA INTERSECTION

This intersection had a relatively high accident rate. The collision diagrams indicate that many accidents are caused by a driver not yielding the right-of-way. After a physical inspection of the intersection, it was determined that this intersection is not clearly defined. A number of motorists were observed running the intersection on the yellow and red signal phases. This may be due to the fact that the traffic signal at this location is partially obstructed to motorists by the adjacent trees. It is recommended that all alternatives be investigated that could improve this intersection. Alternatives should include, but not be limited to, signal modifications, pruning or removal of trees, and advance intersection warning signing.

TSM #10 - MAIN AND LYNDALE INTERSECTION

This intersection is operating near capacity with significant delays and backed-up vehicles on the north and south approaches. The efficiency of this intersection could be increased by altering the north approach to move the vehicles through in less time, thereby allocating more time for the other three approaches.

The north approach to this intersection should be widened to a full two-lane approach starting 300 feet back from the intersection. In addition, a short left-turn bay should be provided. This would result in an 11-foot left-turn bay and an 11-foot through lane as well as an 11-foot right-turn lane. No additional right-of-way will be required (see Figure No. 7).

TSM #11 - MONTANA AND CEDAR INTERSECTION

More than 50 percent of the vehicles on the north, east and west approaches to this intersection perform turning movements. The existing signal is handling the traffic with moderate delays, but it is anticipated that a capacity situation will occur in the near future. The large volume of turning movements at this location require the use of a signal controller designed to handle the situation.

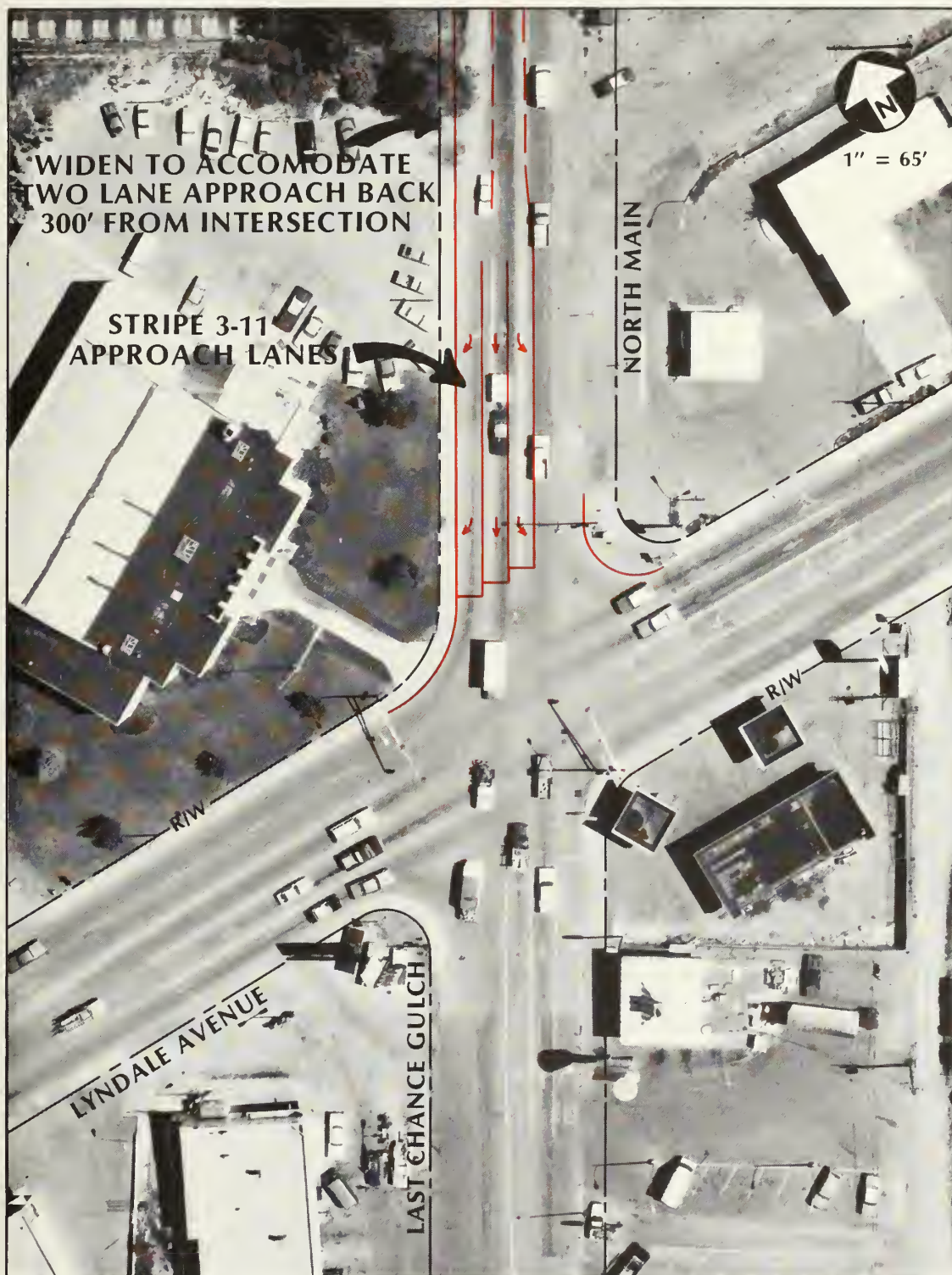


FIGURE 7 — T.S.M. IMPROVEMENT AT MAIN AND LYNDALE

It is recommended to replace the existing four-phase signal controller with an eight-phase controller at this intersection. The greater flexibility of the eight-phase system will increase the intersection capacity and reduce delays on all approaches. It is also recommended that the length of the left-turn bay on the north approach be increased to accommodate additional lane storage. A left-turn arrow lens should be added to the signal for the north approach and a protected left-turn phase added to the signal cycle.

TSM #12 - CUSTER AND MONTANA INTERSECTION

It is anticipated that a capacity problem will occur at this location during the 20-year study period. Adequate approach widths and turning lane storage space is essential to allow vehicles to clear through the intersection in the shortest possible time.

The north, east and west legs of this intersection should be widened to provide full two-lane approaches having minimum lengths of 200 feet on the north and 100 feet on the east and west approaches.

TSM #13 - MONTANA AND BILLINGS INTERSECTION

A large volume of pedestrian traffic has been observed crossing Montana Avenue in the vicinity of Helena High School. Two pedestrian facilities presently exist, one at the Billings and Montana intersection and the other adjacent to the northern boundary of Helena High School. Many of the pedestrians do not properly use the crossing and disrupt the traffic flow. It is recommended that law enforcement be increased in the vicinity in an effort to control this situation. If required, as a last resort some form of fencing barrier along the high school property should be utilized to control pedestrian traffic. Pedestrian safety should be emphasized in the school system, and a pupil safety study for the entire city should be considered.

TSM #14 - ELEVENTH AND MONTANA INTERSECTION

This intersection is operating at capacity, as is evidenced by the long delays and backed-up traffic. Narrow approach lanes and tight turning radii slow the flow of traffic and contribute to the large number of accidents at this location (25 in three years). Minor alterations to the intersection geometrics and some lane use changes will result in a safer, more efficient intersection operation.

The following improvements to this intersection are recommended:

- * The curb turn radius on the northwest corner should be increased to 30 feet
- * The west approach should be widened and restriped to accommodate two 12-foot approach lanes and one 18-foot exit lane
- * The north approach should be restriped and re-signed to provide two exclusive left-turn lanes and a straight/right-turn lane
- * The south approach should be widened and restriped to accommodate three 12-foot approach lanes and one 18-foot exit lane

- * The purchase of a small amount additional right-of-way will be required for the improvements to the northwest corner of the intersection (see Figure No. 8).

TSM #15 - MONTANA AVENUE, BROADWAY TO ELEVENTH

This section of Montana Avenue handles a large volume of traffic. This traffic would pass through more effectively if full use of the roadway width was allowed. For most of the year, there is little use of the parking lanes and it appears that they could be eliminated entirely with minimal inconvenience to the local residents. The use of this portion of roadway as a four-lane facility will also add to the continuity of the entire Montana Avenue corridor.

It is recommended to prohibit all parking on this section of Montana Avenue and to restripe and re-sign this section to provide four travel lanes.

TSM #16 - CITYWIDE SIGNAL MAINTENANCE PROGRAM

There are 26 signalized intersections within the study area. These mechanical devices ultimately control the efficiency of the entire system. Like the study area itself, the traffic demands placed on the system are in a constant state of change.

It is recommended that a signal maintenance program be established to periodically test all detectors and controllers for malfunctions and to establish proper phase timings. A biannual examination by qualified signal specialists can greatly improve the effectiveness of the existing system.

TSM #17 - MILL ROAD AND GREEN MEADOW DRIVE INTERSECTION

This intersection has the greatest night time accident rate (7.58 acc/mve) recorded within the study area. No intersection lighting facilities currently exist at this location.

It is recommended to restripe Green Meadow Drive to prohibit passing on the approach to this intersection. Advance intersection warning signs should be installed on all approaches.

TSM #18 - CEDAR STREET, MONTANA TO I-15 INTERCHANGE

Accident records indicate that the night time accident rate is twice the daytime rate along Cedar Street. Although the Montana - Cedar intersection is illuminated, there are no corridor lighting facilities.

This project consists of the installation of a complete corridor lighting system on this portion of roadway. High-pressure sodium vapor luminaires are recommended. This project may be eligible for state highway safety funds.

TSM #19 - LAST CHANCE AND LAWRENCE INTERSECTION

This high-volume location within the Central Business District was identified as a high accident intersection (1.0 acc/mve). The accident collision diagrams reveal that several accidents involved parked or standing vehicles.

It is recommended that parking be prohibited on the east and west approaches on Lawrence Street within 50 feet of the intersection. This improvement will decrease congestion, increase sight distances and provide additional space for turning movements.

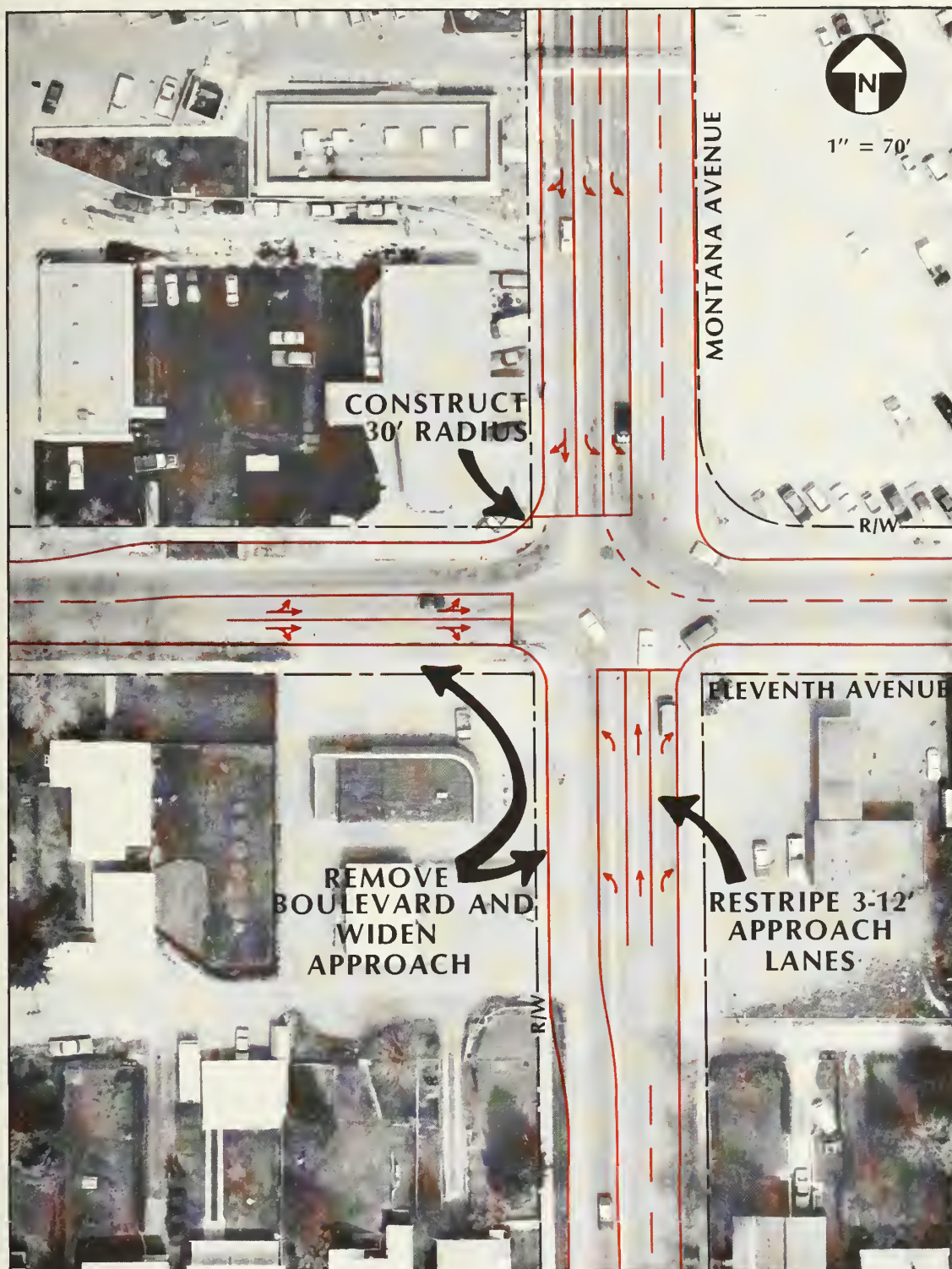


FIGURE 8 — T.S.M. IMPROVEMENT AT ELEVENTH AND MONTANA

TSM #20 - CEDAR STREET, MONTANA TO I-15

This portion of Cedar Street was recently restriped as a four-lane facility. Traffic has been slow in adjusting to this change, since the outside lanes were formerly the roadway shoulders. Many drivers fail to utilize this additional travel lane.

It is recommended to improve the channelization along this corridor by installing curb and gutter where necessary, clearly striping the four travel lanes, and installing directional pavement arrows.

TSM #21 - BENTON AVENUE BIKEWAY

This portion of Benton Avenue is narrow and in poor condition. Pedestrian and bicyclist traffic is very common along Benton, and since there are no road shoulders, this pedestrian/bicyclist traffic must use an adjacent rough dirt path or travel in the street.

This project consists of constructing an asphalt bikepath on the west side of Benton Avenue adjacent to the Sunhaven Subdivision. This bikepath will begin at Custer Avenue and extend southerly across the Burlington Northern Railroad crossing. This addition will provide continuity to the existing Custer Avenue bikepath.

TSM #22 - PROSPECT AND MONTANA INTERSECTION

An unusual situation exists at this location. Due to the double left turn at the adjacent Eleventh and Montana intersection, traffic tends to crowd into the left lane on the north approach to the Prospect-Montana intersection. This traffic usually backs up in a single lane at Prospect, then sorts into two lanes on the approach to Eleventh. It would increase the efficiency of both intersections if the sorting process could take place on the north approach to the Prospect intersection.

Therefore, it is recommended that the north approach be restriped and redesigned to accommodate three ten-foot-wide approach lanes.

TSM #23 - RODNEY AVENUE

Rodney Avenue is a narrow corridor that passes through both business and residential areas. Passage through this corridor is complicated by the presence of parked vehicles on both sides of the street. Parking is not excessively heavy on either side, but is enough to interfere with the flow of traffic.

This improvement consists of removing parking from one side of Rodney from Sixth Street to Helena Avenue. Neighborhood meetings should be held to determine which side of the roadway should have parking restrictions.

TSM #24 - FEE AND ELEVENTH AVENUE INTERSECTION

The west approach to this intersection provides a right-lane ramp for vehicles heading eastbound on Eleventh Avenue. This ramp is signed "yield", giving preference to the southeast-bound traffic. Unfortunately, the ramp is operating as a "running right", creating a hazardous situation. It is recommended that a set of low-profile rumble strips or other driver alerting devices be placed in the pavement of the ramp to reinforce the yield condition.

TSM #25 - MONTANA, HELENA, AND LYNDALD INTERSECTION

Some relief from the delays that presently occur at this intersection can be achieved by altering the signal phasing, and widening the north approach to the intersection.

Additional storage can be provided on the south approach by restriping the right-turn-only lane to a right/through lane. This lane change will require the addition of a north-bound lane between Helena Avenue and the Burlington Northern railroad tracks to allow traffic to merge into one lane. The north approach should be widened slightly and restriped to provide four 11-foot-wide driving lanes.

The addition of an overlap phase will allow all traffic on the south approach to move at one time. This will provide a more effective use of available green time and reduce overall intersection delay.

The addition of this overlap will require the prohibition of eastbound left turns from Lyndale to Montana and Helena Avenues. This left turn is a very light movement (30 vehicles in peak hours), and would not require any major change in present driving habits.

The existing signal control equipment is not capable of providing overlapped signal phasing. The control unit would have to be replaced and consideration should be given to installing control equipment capable of operating the intersection now and in the future.

It is recommended that left-turn movements be prohibited during peak periods. This restriction would affect approximately 30 vehicles during the peak hour of the day and would not require any major changes in present driving habits. It is also recommended to study the possibilities of any other TSM-type improvements, short of geometric changes, that would improve the operational characteristics of this intersection.

TSM #26 - MONTANA AVENUE, LYNDALD TO ELEVENTH

As previously mentioned in the traffic signal system evaluation portion of this chapter, the signals along Montana Avenue from the Helena - Lyndale intersection south to the Eleventh Avenue intersection should be interconnected for coordinated operation. According to a cost/benefit analysis, this improvement will pay for itself in less than four years, based on fuel savings.

TSM #27 - WASHINGTON AND CEDAR INTERSECTION

Advanced intersection warning signs should be installed on Washington and Cedar Streets. The approach to the intersection that is the interstate off ramp should be striped to accommodate two approach lanes; a left-turn-only lane and a through- and right-turn lane. Painted stop bars should be installed on both Washington Street approaches. The shoulder of the road on the east side of the intersection should be reshaped to a 6:1 slope. The Helena Airport Authority has indicated a willingness to assist with financing this improvement.

TSM #28 - MONTANA AVENUE, CHERRY TO CUSTER

This section of Montana Avenue presently operates with two northbound lanes and one southbound lane. To improve the continuity of this section, it is recommended to widen the roadway shoulder on the west side of Montana. The

pavement should be widened and restriped to provide two 12-foot-wide travel lanes for southbound traffic.

TSM #29 - NORTH MONTANA AVENUE, CUSTER TO SIERRA

This section of Montana Avenue is signed for a 55 mph travel speed. There is no access control and driveways are numerous. To improve the flow of traffic through this corridor, the following improvements are recommended:

- * Widen the pavement and restripe to provide turning bays at Sierra, Mill, and Forestvale Roads.
- * Improve existing turning bays at Valley Forge, Buffalo and Beaverhead Roads.
- * Improve intersection warning signs at all aforementioned intersections.

TSM #30 - SIERRA ROAD PEDESTRIAN PATH

There is a large amount of pedestrian traffic along Sierra Road between the Rossiter School and Montana Avenue. Although crossing facilities exist near the school and on Montana Avenue, there is no path along Sierra for school children to use. It is recommended that an asphalted pedestrian path be constructed on the north side of Sierra Road from the school to Montana Avenue.

TSM #31 - BROADWAY AT DAVIS

Broadway changes alignment in the vicinity of Davis Street. This curve results in the traffic traveling outside of the designated lanes and results in a potential hazard to vehicles parked along Broadway. It is recommended to restrict parking along the north side of Broadway for a minimum of 200 feet east of Davis Street.

CHAPTER V

MAJOR NETWORK IMPROVEMENTS

A. METHODS AND PROCEDURES

Major street network improvements are those improvements that would significantly change the physical characteristics of a segment of street. The process used to identify appropriate improvements was to examine the major deficiencies in the major street network that were revealed during the problem identification process described in Chapter II. The improvements recommended in the 1970 Transportation Plan were reviewed to see which improvements were still applicable. Recommended improvements based on other studies were added to the improvement list. Additional improvements were developed to resolve those deficiencies that may not have been covered in this list of improvements developed to this point.

The result of this process was a list of improvements that was applicable to solving some of the problems and relieving some of the deficiencies in the major street network. Those improvements that lent themselves to testing on the computer traffic assignment model were tested to determine their effect on traffic. These improvements were then reviewed with the Transportation Ad-Hoc Review Committee, and tentative priorities for improvements were established.

B. RECOMMENDED IMPROVEMENTS

The ranking shown is intended to be a general guide and not an inflexible order of improvements. It is recognized that funding availability and other factors will require adjustment in this ranking.

The major network improvements that have been committed to by local government are included at the beginning of the list to permit a comprehensive view of the improvements proposed.

Descriptions of the committed and recommended major street network improvements are as follows:

COMMITTED IMPROVEMENT "A" - CRUSE AVENUE EXTENSION

This project begins at the northern terminus of the existing Cruse Avenue and extends northerly along Allen Street to the Lawrence Street intersection. Alignment Alternate No. 4, which is contained in the Cruse Avenue Environmental Impact Statement, was chosen by the Transportation Coordinating Committee. This alternate extends Cruse Avenue to the north from Sixth to Placer and then along Jackson Street to Eleventh Avenue. Cruse Avenue would then angle to

the northwest to connect with the Neill, Helena, Main intersection. Eleventh Avenue would connect to Cruse Avenue and remain through to Last Chance Gulch as a two-lane westbound facility.

Cruse Avenue will consist of two 12-foot driving lanes, a 14-foot-wide painted median with turning bays, two 10-foot parking lanes, curb and gutter, and sidewalks. All necessary right-of-way land acquisition is included under this improvement. This project is programmed to be bid in April, 1984.

COMMITTED IMPROVEMENT "B" - LAST CHANCE GULCH, NEILL TO LYNDAL

Last Chance Gulch is to be improved within the existing right-of-way. The proposed two-lane facility will include two 12-foot driving lanes and a 10-foot painted median, two 10-foot parking lanes, curb and gutter, and sidewalks. This project is tentatively scheduled to be bid in Fiscal Year 1984.

COMMITTED IMPROVEMENT "C" - NORTH LAST CHANCE GULCH, LYNDAL TO MONTANA

This section of Last Chance Gulch is to be reconstructed to a four-lane facility. The proposed roadway will consist of a 14-foot curbed median, two 12-foot and two 14-foot driving lanes, curb and gutter, and sidewalks. A new four-lane railroad overpass will be constructed. Acquisition of additional right-of-way will be required for the wider section. This project is not scheduled to be let for construction prior to Fiscal Year 1986.

COMMITTED IMPROVEMENT "D" - U.S. 12 WEST OF WILLIAMS ROAD

This improvement is the first phase in the road reconstruction project from Williams Road west to the Rimini Road turnoff. U.S. 12 is to be reconstructed to a four-lane divided facility from Williams Road approximately 1.3 miles west. The proposed typical roadway section includes a 14-foot curbed median, four 12-foot driving lanes, two 10-foot emergency parking lanes, curb and gutter. Additional right-of-way is required and is considered part of this improvement. This project is tentatively scheduled to be bid in Fiscal Year 1983.

RECOMMENDED IMPROVEMENT #1 - BELT VIEW INTERCHANGE ON I-15

An interstate interchange at the Belt View location will reduce the loading of the Capitol interchange and the Prospect - Eleventh Avenue one-way couplet. Access to St. Peter's Hospital from East Helena and Jefferson County would also be greatly improved. The southeast portion of the study area is anticipated to grow rapidly, and this interchange would provide access to the new developments and provide the basis for a street network in the area.

This project consists of the construction of a two-lane crossroad overpass with on and off ramps required for a typical diamond interchange. The proposed interchange is to be located at the easterly extension of Belt View Drive. Acquisition of approximately 20 acres will be required for the interchange; however, it is anticipated that developers in the area will donate the necessary right-of-way. Therefore, right-of-way costs have not been included as part of this project.

RECOMMENDED IMPROVEMENT #2 - CUSTER AVENUE INTERCHANGE ON I-15

Custer Avenue is the major collector route serving the northern portion of the city. From a traffic standpoint, it is desirable to utilize Custer as an east-west corridor connecting U.S. 12 on the west (see Improvement #11) and the valley traffic on the east to I-15. An interchange at Custer would provide relief to the North Montana Avenue congestion and also draw some of the traffic load from U.S. 12 through town. This improvement would increase the effective use of several existing network links and provide better access to the north end of the city.

This recommended improvement calls for the construction of an interstate interchange at Custer Avenue. Additional right-of-way will be required for the interchange ramps and a parallel crossroad overpass bridge. Custer Avenue should be reconstructed to provide four driving lanes extending from the overpass to the ramp terminals with provisions for left-turn bays at the terminals.

RECOMMENDED IMPROVEMENT #3 - MONTANA, LYNDALE, HELENA INTERSECTION

The Montana-Lyndale-Helena intersection is the crossroads of the prominent north-south and east-west traffic flows. This intersection is operating at capacity with significant delays in all directions. The operation of this intersection controls the effectiveness of several major urban routes. The implementation of Improvement #4, the extension of Railroad Avenue to U.S. 12, will alter the traffic patterns and increase the volume of traffic at this intersection. Therefore, it is essential to alleviate the problems that are causing the bottleneck at this location.

This project includes improving the operational characteristics of this intersection by increasing its capacity by means compatible with business and residential districts and funding. All possible methods of improving this intersection should be examined, with geometric changes being a last resort.

RECOMMENDED IMPROVEMENT #4 - RAILROAD AVENUE EXTENSION TO U.S. 12

The U.S. 12 corridor is presently carrying over 17,000 veh/day on Montana and over 10,000 veh/day on each leg of the one-way couplet. Many of the major intersections on U.S. 12 are approaching capacity, and the increase in traffic projected for the next 20 years will create an intolerable situation.

It is recommended that an alternate route for the U.S. 12 traffic be constructed. The effects of such a route were tested by the Department of Highways. This route would draw over 8,000 veh/day from the east portion of U.S. 12, reducing the pressure of increasing traffic volumes.

This improvement consists of the construction of a network link between the Montana, Helena, Lyndale intersection and U.S. 12 at Eighteenth Street. The recommended alignment would utilize a portion of Helena Avenue and Railroad Avenue and would extend easterly adjacent to the B.N. tracks, under the interstate, and would terminate at the U.S. 12 and Eighteenth Street intersection. The roadway section would consist of a 44-foot-wide paved surface with curb and gutter striped for two-way traffic and parking on both sides. It is also recommended that a complete route location study be initiated to examine

other possible alignments (see Figure No. 9).

It should be noted that due to the fact that this project's western terminus is at the Helena-Lyndale-Montana intersection, a suitable means of traffic control will be necessary. Therefore, Improvements #3 and #4 are interrelated and should be considered together. Although the planning stages of these two improvement projects can be conducted independently, the actual construction phase of the Railroad Avenue extension should not be completed prior to the completion of Improvement #3.

RECOMMENDED IMPROVEMENT #5 - WEST FRONTAGE ROAD, BROADWAY TO JEFFERSON COUNTY LINE

The southeastern portion of the Helena urban area is developing rapidly, as is northern Jefferson County. At present, there is no major link in the street network to provide local access to these developing areas. It is recommended that a frontage road be constructed parallel to I-15. Colonial Drive should be extended southerly from Broadway to the Jefferson County line. The proposed roadway section should consist of a 36-foot-wide paved surface, striped for two-way traffic. It is anticipated that the required right-of-way will be donated by private developers; therefore, right-of-way costs have not been included as part of this project. This proposed roadway should be added to the major street network.

RECOMMENDED IMPROVEMENT #6 - NORTH VALLEY INTERCHANGE AT I-15

Housing growth in the valley has exerted a great pressure on North Montana Avenue to carry the increased traffic. The lack of access to the interstate in the valley creates a situation in which the two-lane Montana Avenue facility is approaching capacity while the four-lane interstate through the area carries a relatively light traffic volume. An interchange in the north valley would reduce the volumes on Montana Avenue, shorten overall travel times and minimize road user costs.

An interchange location study should be conducted to determine the most feasible site. This project includes the purchase of any necessary right-of-way and construction of the facility.

RECOMMENDED IMPROVEMENT #7 - PEDESTRIAN CROSSING OF I-15 IN VICINITY OF HIGHWAY DEPARTMENT

Approximately 20 to 30 pedestrians cross I-15 daily near the Department of Highways facility. It appears that this traffic is generated by Smith School, St. Peter's Hospital and the Department of Highways. This is an extremely hazardous situation that could be remedied by a pedestrian crossing.

Under this improvement project, a pedestrian facility is to be placed across I-15 to service the pedestrian/bicyclist traffic. This facility will provide for a safe pedestrian crossing of I-15 and will make the East Helena Bikeway much more usable and accessible. A feasibility and location study is currently being conducted by the DOH to determine the most appropriate type of structure (overpass or underpass) and the most effective location within the general vicinity of the Highway Department (south of U.S. 12).



FIGURE 9 — RAILROAD AVENUE EXTENTION TO U.S. 12

RECOMMENDED IMPROVEMENT #8 - NORTH MONTANA, LYNDAL TO CEDAR

This section of Montana Avenue presently carries more than 10,000 vehicles per day over a rough, two-lane facility. Commercial development along this corridor has increased the volume of turning movements to the point that it is a significant disturbance to the traffic flow. The unpaved roadway shoulders receive a great deal of traffic as motorists circumvent delays caused by turning vehicles. This section of Montana Avenue was classified as "poor" in the road condition survey. Upgrading this facility to four travel lanes would provide space for turning vehicles and would handle the future volume demands more efficiently.

It is recommended that this portion of North Montana be reconstructed to a four-lane facility. The proposed roadway section will consist of a 14-foot-wide median with turning bays, two 12-foot and two 14-foot driving lanes, curb and gutter. A corridor lighting system is to be installed as part of this improvement. Also included in this project will be a 31,000-foot storm sewer system. No additional right-of-way will be required.

RECOMMENDED IMPROVEMENT #9 - MONTANA AVENUE, CEDAR TO CUSTER

This section of Montana Avenue varies in places from a two-lane to a four-lane facility. Lane striping is confusing and merge situations occur without warning. To improve section continuity, the entire roadway should be widened to a full four-lane facility.

This improvement consists of reconstructing North Montana to a 66-foot-wide, four-lane facility. The roadway section would include a 14-foot painted median with turning bays, two 12-foot and two 14-foot driving lanes, curb and gutter. Installation of a storm sewer system and a corridor lighting system is also recommended as part of this improvement. No additional right-of-way is required for this project.

RECOMMENDED IMPROVEMENT #10 - CUSTER AVENUE, MONTANA AVENUE TO WASHINGTON STREET

When the Custer Avenue - I-15 interchange is installed (see Improvement #2), the volumes on Custer will increase and the traffic demand will change. To better handle this increased loading, Custer Avenue should be widened to a four-lane facility from Montana Avenue to Washington Street.

Under this improvement project, Custer Avenue is to be reconstructed to a 56-foot-wide four-lane facility from Montana Avenue easterly to the proposed I-15 interchange, and from the interchange easterly to the intersection of Custer and Washington Street. The typical roadway section proposed includes a four-foot-wide painted median, four 13-foot-wide driving lanes, curb and gutter. Some additional right-of-way is required for this improvement. The cost for this right-of-way has been included in the cost estimate for this project.

RECOMMENDED IMPROVEMENT #11 - CUSTER AVENUE TO U.S. 12

Custer Avenue is the major traffic collector on the north end of the city. The western terminus of Custer Avenue is presently at Henderson Avenue. If Custer were extended westward to intersect with U.S. 12, it would become considerably more effective as a collector route and would divert some traffic from

Euclid Avenue, which is heavily travelled.

This improvement calls for the construction of a 44-foot-wide paved roadway extending westerly to U.S. 12. A route location study should be conducted to determine the most feasible alignment. Care should be taken to minimize the adverse effects on Ryan Park and Spring Meadow Lake.

RECOMMENDED IMPROVEMENT #12 - WASHINGTON STREET RECONSTRUCTION FROM CEDAR TO CUSTER

Washington Street serves as an access route for Helena valley traffic to the I-15 interchange at Cedar and the downtown area. This section of road carries approximately 3,000 vehicles per day, with volumes expected to double in the next twenty years. The existing condition of Washington Street is poor, with sections having sharp curves, narrow driving lanes and no shoulders. The pavement surface is deteriorating and requires constant patching.

It is recommended to reconstruct the entire length of Washington Street and to realign the southern portion near the intersection at Cedar. The proposed roadway section consists of two 14-foot driving lanes with two 4-foot shoulders. Some additional right-of-way will be required to realign the southern terminus. It should be noted that the Helena Airport Board has indicated a willingness to assist with the funding of this project.

RECOMMENDED IMPROVEMENT #13 - EXTENSION OF BELT VIEW DRIVE TO U.S. 12

This addition to the major street network in conjunction with the recommended Belt View Drive interchange (Improvement #1) will divert approximately 4,000 vehicles per day from the Capitol interchange. The extension of Belt View Drive will provide improved access to the Department of Highways complex and St. Peter's Hospital, and will serve a rapidly growing area of Helena.

This improvement consists of construction of a 44-foot-wide paved roadway from the proposed Belt View/I-15 Interchange northeasterly, terminating on U.S. 12 east of the Exxon Petroleum Depot. The recommended roadway section includes two 12-foot driving lanes, two 10-foot paved shoulders, and parallel surface drainage ditches where necessary. No right-of-way exists at present to provide for the proposed roadway; therefore, all necessary land acquisition is included as part of this improvement (see Figure No. 10). This proposed roadway should be added to the major street network.

IMPROVEMENT #14 - SOUTHERLY EXTENSION OF McHUGH LANE FROM COLE AVENUE

During the review process of this document, the Transportation Coordinating Committee decided to include this improvement in the Plan. Alignment possibilities to be considered include: 1) extending McHugh south to the Burlington Northern tracks, then west to Benton; 2) extending McHugh south to the BN tracks, then east to North Main; 3) extending McHugh south and connecting to Aspen Street; 4) extending McHugh south across the BN tracks to connect with Neill; and 5) terminating McHugh at Cole. A route location study would be required to evaluate all possible alignments. This project will include the acquisition of right-of-way and construction costs.



**FIGURE 10 — BELT VIEW DRIVE EXTENSION TO
U.S. 12**

RECOMMENDED IMPROVEMENT #15 - GREEN MEADOW DRIVE, SIERRA TO CUSTER

Green Meadow Drive is a minor arterial servicing valley traffic. The road surface was identified as being in poor condition. This project includes the reconstruction of Green Meadow Drive from Sierra to Custer. The improved roadway section should include two 12-foot driving lanes with eight-foot shoulders.

RECOMMENDED IMPROVEMENT #16 - MCHUGH LANE, MILL TO CUSTER

The road surface on McHugh Lane was identified as being in poor to very poor condition. This improvement project includes the reconstruction of McHugh Lane from Mill Road to Custer Avenue. The roadway section should include two 12-foot driving lanes and two eight-foot shoulders. Also included in this project is the construction of a pedestrian/bicycle path on the west side of McHugh Lane.

RECOMMENDED IMPROVEMENT #17 - BENTON AVENUE FROM RAILROAD TRACKS TO CUSTER

This section of Benton will carry approximately 6,000 vehicles per day in the year 2000. The existing facility was identified as being in very poor condition, and the narrow roadway width, dirt shoulders, and rough surface contribute to difficulties in driving this section. With increased development along Benton, turning vehicles have become a major problem. Upgrading this link of the network will improve the movement of the north-south traffic and provide continuity to the system.

Under this improvement project, Benton Avenue would be reconstructed to a 44-foot-wide, two-lane facility from the Burlington Northern at-grade crossing to the Custer Avenue intersection. The roadway section would include two 12-foot driving lanes, two 10-foot paved shoulders, and adjacent surface drainage ditches where required. Improving the at-grade railroad crossing is included as part of this project. No additional right-of-way is required for this improvement.

RECOMMENDED IMPROVEMENT #18 - MONTANA AVENUE, CUSTER TO SIERRA

North Montana Avenue is the major north-south route between the valley and the downtown area. It is anticipated that traffic volumes on this road will double in the next twenty years (from 7,000 veh/day to 14,000 veh/day). This section of Montana is signed for a 55 mph speed limit. Turning vehicles present a hazard along this roadway; widening the section to include paved shoulders which would serve as turning bays would provide for an uninterrupted traffic flow.

It is recommended to upgrade approximately 16,000 feet of North Montana Avenue from the Custer Avenue intersection north to the intersection at Sierra Road. The proposed roadway section includes two 12-foot driving lanes, two 10-foot paved shoulders, and improved adjacent drainage ditches, where necessary. No additional right-of-way is required.

RECOMMENDED IMPROVEMENT #19 - GREEN MEADOW DRIVE TO NORTH BENTON AVENUE REALIGNMENT

Benton Avenue and Green Meadow Drive carry a large volume of north-south traffic. The continuity of this corridor is interrupted at Custer Avenue. Green Meadow Drive and Benton Avenue intersect Custer with an offset of approximately 1,200 feet. It is recommended that Green Meadow Drive be realigned to intersect with Custer at Benton Avenue.

This improvement to the network consists of purchasing approximately 30,000 square feet of right-of-way required for the realignment. The typical roadway section to be constructed as part of this project is a 28-foot-wide paved surface, striped for two-way traffic. Surface drainage ditches will be constructed where necessary (see Figure No. 11).

RECOMMENDED IMPROVEMENT #20 - SIXTH AVENUE AND DAVIS STREET INTERSECTION

The Sixth Street corridor is a major link between the Central Business District and the Capital Complex, serving approximately 3,500 vehicles per day. A significant change in the alignment of the corridor occurs at the Davis Street intersection. The presence of an apartment building on the northwest corner combined with poor approach geometrics creates a potentially hazardous situation. The north and west approaches have extremely limited sight distances.

It is recommended that the apartment building on the northwest corner be removed and the property acquired for right-of-way purposes. The east-west approaches should be realigned to provide for the safe, smooth flow of traffic with adequate sight distances.

RECOMMENDED IMPROVEMENT #21 - WASHINGTON STREET AND FRONTAGE ROAD REALIGNMENT

Washington Street and the I-15 Frontage Road intersection on Custer Avenue are presently offset by approximately 1,400 feet. This improvement project would realign the Frontage Road to intersect Custer Avenue at Washington Street to provide better continuity to the system. The recommended roadway section consists of a 28-foot-wide paved surface striped for two-way traffic. Adjacent drainage ditches will be constructed where necessary. Acquisition of right-of-way is required for this improvement and is included in the improvement costs shown in Table 4 (also see Figure No. 12).



FIGURE 11 — GREEN MEADOW DRIVE — BENTON AVENUE REALIGNMENT



FIGURE 12 — WASHINGTON STREET — FRONTAGE ROAD REALIGNMENT

The following improvements have been included in the Plan by the Transportation Coordinating Committee. The funding sources and tentative time schedules for implementation of these improvements have not been identified.

IMPROVEMENT #22 - MONTANA AVENUE RAILROAD GRADE SEPARATION

A detailed study should be conducted to determine the feasibility of a railroad underpass on Montana Avenue. This improvement project includes the acquisition of necessary right-of-way and the construction of the underpass facility and frontage roads.

IMPROVEMENT #23 - SOUTHWEST CONNECTOR TO DOWNTOWN

This improvement project includes a route location study evaluating the possible alignments of a southerly extension of Le Grande Cannon terminating in the downtown area. Also included as part of this project would be the acquisition of necessary right-of-way and road construction.

IMPROVEMENT #24 - SOUTH/SOUTHEAST ARTERIAL STUDY

A detailed route location and feasibility study should be conducted to evaluate the possibilities of constructing a southeast arterial that would connect the downtown area to the interstate frontage road in northern Jefferson County and possible connections with the existing Helena street network. Since a large portion of this arterial route would fall outside of the urban study boundary in northern Jefferson County, this project should be conducted with the cooperation of Jefferson County.

CHAPTER VI

SUMMARY OF RECOMMENDED TRANSPORTATION PLAN

A. RECOMMENDED T.S.M. IMPROVEMENTS

Transportation System Management (T.S.M.) projects are principally concerned with relatively low-cost improvements that improve traffic operations while increasing the utilization and efficiency of existing facilities. This Transportation Plan recognizes the financial restraints on implementing major construction-type improvements, and therefore has emphasized the transportation system management concept. Therefore, a large number of TSM-type improvements have been identified and included in this report.

Table No. 3 which follows lists the recommended TSM improvements and the cost associated with each improvement. It should be noted that the costs may vary significantly, depending on the methods used to implement the improvement; i.e., the use of force account versus contract. Detailed descriptions of each project were given in Chapter V.

No priorities have been assigned to the TSM improvements. It is expected that the City and County can choose the most important improvements from the TSM list and proceed to implement these improvements immediately. If requested by the governing bodies, the Transportation Coordinating Committee could select the projects in order of priority.

Figure No. 13 shows the locations of the recommended TSM improvements.

Several of the TSM improvements are designed to provide immediate relief from an existing problem that is also addressed by a major network improvement. In these particular cases, it was felt that both short- and long-range solutions should be presented.

B. RECOMMENDED STREET NETWORK IMPROVEMENTS

Major street network improvements have been categorized into periods of: 1) present to 1990; 2) 1990 to 2000; and 3) after 2000. These improvements have been selected on the basis of the existing problems which are evident in the transportation planning area. The improvements which show the greatest impact on the street network system include new connections at Belt View and Custer Avenue to the Interstate, a new highway link from Eighteenth Street to Railroad Avenue to Lyndale, and a western extension of Custer Avenue to U.S. 12 at Joslyn. These improvements show a major traffic diversion from the congested Eleventh, Prospect, Montana, Lyndale corridor. Other improvements were selected to relieve capacity and/or street surfacing problems that may exist.

The recommended street network improvements are shown in Table No. 4

TABLE 3
T.S.M. IMPROVEMENTS*

No.	Location	Description	System Designation	Cost
<u>Committed Improvements:</u>				
	Euclid & Joslyn Intersection	Intersection signalization	Primary/Non-Federal	\$40,000
	Benton & Euclid Intersection	Overhead signing	Primary/Non-Federal	2,000
Total: Committed T.S.M. Improvement Costs				\$42,000
<u>Recommended Improvements:</u>				
1	Benton & Euclid Intersection	Striping & curbing improvements to improve channelization	Primary/Urban	\$ 9,150
2	Benton - Neill to Euclid	Signed for no parking during peak periods	Urban	5,500
3	Benton - Leslie to Euclid	No parking on west side & restripe approach lanes	Urban	1,500
4	Benton & Hauser Intersection	Remove parking on Hauser near intersection	Urban/Non-Federal	1,000
5	Euclid & Henderson Intersection	Improve use of pedestrian facilities	Primary/Urban	N.A.
6	Broadway & Last Chance Mall	Upgrade pedestrian facilities	Urban	2,800
7	Sixth & Rodney Intersection	Remove parking on approaches to intersection	Urban/Non-Federal Aid	1,000
8	Eleventh & Rodney	Remove parking on approaches to intersection	Urban/Non-Federal Aid	1,000
9	Rodney & Helena Intersection	Replace signal standards	Non-Federal Aid	15,000
10	Main & Lyndale Intersection	Widen & provide left-turn bay on north approach	Primary/Urban	7,500
11	Montana & Cedar Intersection	Replace traffic controller & increase length of left-turn bay on north approach	Urban	27,500
12	Montana & Custer Intersection	Widen Custer Avenue approach to two lanes	Urban	8,700
13	Montana & Billings Intersection	Improve use of pedestrian facilities	Urban	N.A.
14	Eleventh & Montana Intersection	Widening, striping & curbing improvements to improve traffic flow	Primary/Urban	19,700
15	Montana - Broadway to Eleventh	Remove parking and stripe to provide four travel lanes	Urban	3,500
16	Citywide Signal Maintenance Program	Develop maintenance program to adjust & maintain all signals	Non-Federal Aid	26,000/yr.

* The improvement numbers shown are for reference purposes only and do not indicate any priority or relative importance

TABLE 3

(continued)

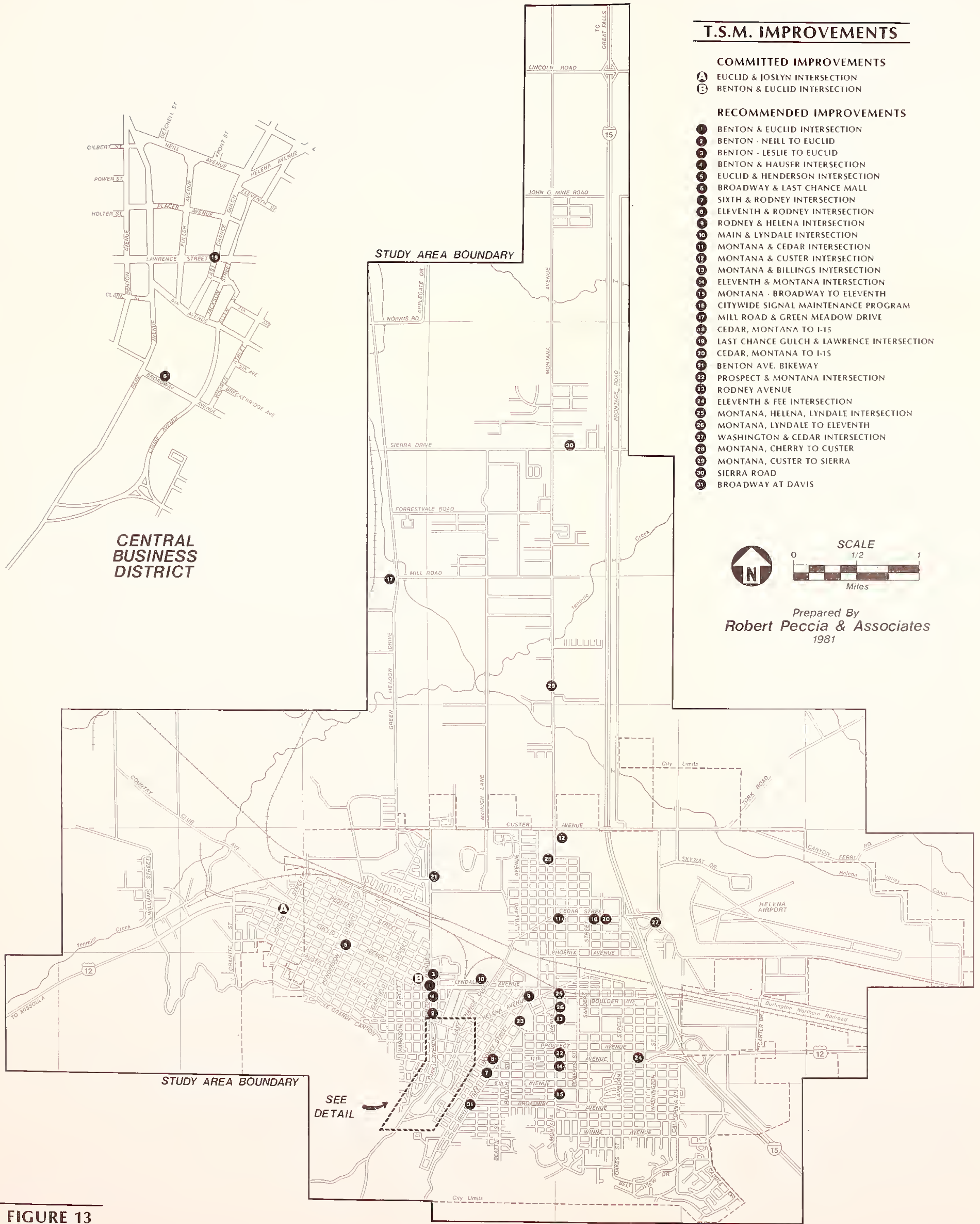
No.	Location	Description	System Designation	Cost
17	Mill Road & Green Meadow Drive	Install roadway striping & intersection signing	Non-Federal Aid	\$ 600
18	Cedar, Montana to I-15	Install corridor lighting system	Highway Safety	118,000
19	Last Chance Gulch & Lawrence Intersection	Remove parking on east & west approaches to intersection	Non-Federal Aid	1,000
20	Cedar, Montana to I-15	Striping, curbing & directional arrows to improve channelization	Urban	7,800
21	Benton Avenue Bikeway	Construct new asphalt bikeway on west side of Benton	Non-Federal Aid	25,000
22	Prospect & Montana Intersection	Restripe north approach to three 10-foot approach lanes	Primary	1,200
23	Rodney Avenue	Remove parking from one side, Sixth to Helena	Non-Federal Aid	7,100
24	Eleventh & Fee Intersection	Install rumble strips on right ramp	Primary/Urban	500
25	Montana, Helena, Lyndale Intersection	Install new controller unit & widen Montana to two northbound lanes; TSM study	Primary/Urban	60,000
26	Montana, Lyndale to Eleventh	Interconnect signals for coordinated operation	Primary	95,000
27	Washington & Cedar Street Intersection	Signal stripe intersection approaches	Urban/Non-Federal* Aid	800
28	Montana, Cherry to Custer	Widen & stripe two southbound lanes	Urban	36,000
29	North Montana, Custer to Sierra	Add turning bays & install warning signing	Urban	60,000
30	Sierra, Rossiter School to Montana Avenue	Install pedestrian path on north side of Sierra	Non-Federal Aid	9,000
31	Broadway at Davis	Remove parking for 200 feet on north side of Broadway	Non-Federal Aid	500

TOTAL: Recommended T.S.M. Improvement Costs[†] **\$26,350

* Possible supplemental funding from the Helena Airport Board

† All amounts shown represent 1981 costs

** \$26,000/yr. cost of TSM Improvement No. 16 not included



and Figure No. 14. Improvement projects are not ranked in any order of priority, other than according to the year groupings of present to 1990, 1990 to 2000, and after 2000. It is recognized that these priorities are not absolute and depend upon the availability of funding as well as a selection of priorities by the City - County Transportation Coordinating Committee.

Figure No. 15 shows the estimated traffic volumes that will occur on the major street network in the year 2000 if the transportation system improvements are implemented. Most notable are the effects of the additional I-15 interchanges, the extension of Railroad Avenue to the east, and the western extension of Custer Avenue. The addition of the I-15 interchanges will cause a shift in the traffic loading from portions of North Montana Avenue to the interstate. Greater emphasis will be placed on Custer Avenue as both a collector and a through route, with 4,400 vehicles per day using the western extension as access to U.S. 12. The eastern extension of Railroad Avenue will service over 8,800 vehicles per day, which is expected to relieve many of the problems anticipated on the Eleventh and Prospect couplet and portions of Montana Avenue.

Through the implementation of the recommended improvements, a greater level of service can be achieved throughout the entire major street network.

C. PRESIDENT'S URBAN POLICY

The Helena Urban Transportation Plan - 1981 Update has been formulated in conformance with the U.S. Department of Transportation's Urban Transportation Policy objectives. The following paragraphs describe how these objectives were reflected in the Transportation Plan:

1. Urban Impact

The highest priority projects will provide improved access to downtown Helena and will assist in the economic revitalization of the central city. In particular, the committed improvements of Cruse Avenue and North Last Chance Gulch will substantially and directly improve transportation access to the downtown area. The improvements on Benton, Montana, and Sixth Avenue will indirectly improve access to the downtown since these are peripheral streets that feed into the downtown area. This improved access should increase property values and improve the economic climate in downtown Helena. These plans are consistent with the Helena Comprehensive Plan and the past policies of encouraging new development in downtown Helena.

It is expected that the improved access will make development in downtown Helena more attractive, and will increase employment and retail sales. These factors, combined with increased property values, will generate additional tax revenues. As a result of these measures, the public expenditures which were invested in urban renewal will show a higher usage. The increased activity in the central city will tend to discourage scattered commercial development and lessen environmental impacts on surrounding areas. None of the projects proposed will penetrate or adversely affect existing neighborhoods. Air quality,

TABLE 4
STREET NETWORK IMPROVEMENTS †
(PRESENT TO 1990)

No.	Location	Description	Funding Category	Cost
<u>Committed Improvements</u>				
A.	Cruse Avenue	Extend from Sixth to Eleventh	Urban *	\$2,410,500
B.	N. Last Chance Gulch	Reconstruct to widened two-lane from Neill to Lyndale	Urban *	385,500
C.	N. Last Chance Gulch	Reconstruct to four-lane from Lyndale to Montana	Urban (Possibly Primary)**	3,079,100
D.	U.S. 12 West	Reconstruct to four-lane from Fort Harrison Road west 2.1 miles	Primary	4,402,000
Total: Committed Improvements				\$10,277,100
<u>Recommended Improvements:</u>				
1	Belt View Interchange	Construct new interchange at Belt View Drive and I-15	Private, SID Econ. Growth Center (Poss. Interstate 4-R)	1,807,000
2	Custer Avenue Interchange	Construct new interchange at Custer Avenue and I-15	Private, SID (Poss. Interstate 4-R)	1,250,000
3	Montana, Lyndale, Helena	Improve intersection	Primary	280,000
4	Helena & Railroad Avenue	Extend easterly to U.S. 12	Urban Econ. Growth Ctr.	1,145,000
5	West Frontage Road	Extend southerly from Broadway to county line	Private	900,000
6	I-15 North Interchange	Construct new interchange at Mill, Forestvale or Sierra (Sierra cost shown)	Urban (Poss. Interstate 4-R)	596,000
7	I-15 South of U.S. 12	Construct a pedestrian crossing on I-15 south of U.S. 12	Primary Econ. Growth Ctr. (Poss. Safety Funds)	200,000
Total: Recommended Improvements, Present to 1990				\$6,178,000

† Improvement numbers shown are for text reference purposes only and do not imply any priority or relative importance.

* Possible sources of supplemental funds are Urban Renewal close-out funds, proceeds from the sale of property currently held by the City under Urban Renewal, and revenue generated from a tax increment financing district in the Helena downtown area.

** System action would be required to change to Primary.

TABLE 4
(Continued)
(1990 - 2000)

No.	Location	Description	Funding Category	Cost
8	N. Montana Avenue	Reconstruct to four-lane from Lyndale to Cedar	Urban	\$1,104,000
9	N. Montana Avenue	Reconstruct to four-lane from Cedar to Custer	Urban	\$1,140,000
10	Custer Avenue	Reconstruct to four-lane from Montana to Washington	Urban, Private	426,000
11	Custer Avenue	Extend westerly to U.S. 12	Urban	1,000,000
12	Washington Street	Reconstruct from Cedar to Custer	Urban *	620,000
13	Belt View Drive	Extend from Belt View Interchange to U.S. 12	Private, SID Urban	472,000
14	McHugh Lane	Extension from Cole, south	SID, Gas Tax	Unknown
15	Green Meadow Drive	Reconstruct to an improved two-lane	Non-Federal Aid	125,000
16	McHugh Lane	Reconstruct to an improved two-lane with Pedestrian/Bicycle path on west side	Non-Federal Aid	125,000

Total: Recommended Improvements, 1990 to 2000
(Does not include No. 14) \$5,102,000

(2000 +)

17	Benton Avenue	Reconstruct to widened two-lane from Custer to R.R. tracks	Urban	\$486,000
18	N. Montana Avenue	Reconstruct from Custer to Sierra	Urban	971,000
19	N. Benton Avenue	Realign Green Meadow with Benton	Urban	453,000
20	Sixth Avenue	Realign Sixth Avenue at Davis Intersection	Urban	413,000
21	Frontage Road	Realign with Washington Street at Custer	Urban	720,000

Total: Recommended Improvements, 2000+ \$3,043,000

(Not Dated)

22	Montana Avenue	Railroad Grade Separation	Unknown	Unknown
23	Southwest Side Connector	Extension of Le Grande Cannon	Unknown	Unknown
24	South/Southeast Arterial Study	Study possibility of connecting the Downtown area to the Interstate Frontage Road in northern Jefferson County	Unknown	Unknown

TOTAL, ALL MAJOR IMPROVEMENTS †
(Does not include Nos. 14, 22, 23, 24) \$24,510,100

* Possible supplemental funding from the Helena Airport Board

† All amounts shown represent 1981 costs (Time of Implementation Unknown)

COMMITTED IMPROVEMENTS

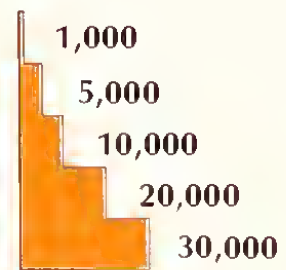
- ## RECOMMENDED IMPROVEMENTS

-

**CENTRAL
BUSINESS
DISTRICT**

FIGURE 14

**YEAR 2000
TRAFFIC VOLUMES ***



VOLUMES REPRESENT ANNUAL
AVERAGE DAILY TRAFFIC

***BASED ON IMPLEMENTATION
OF MAJOR NETWORK
IMPROVEMENTS**



Prepared By
Robert Peccia & Associates
1981

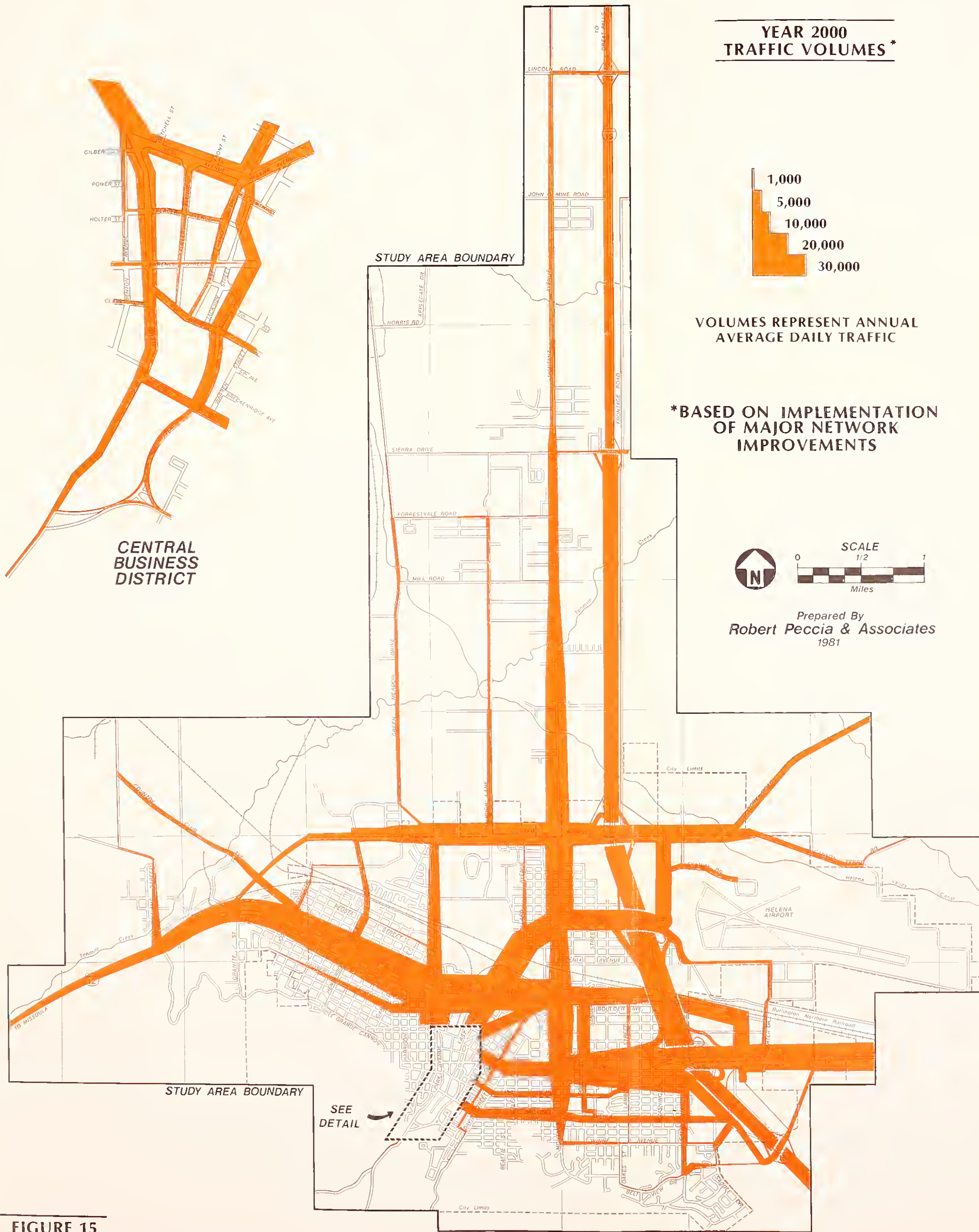


FIGURE 15

noise levels, water quality and visual quality will likewise be improved due to the increased efficiency of the transportation system that will result from the proposed improvements.

2. Energy

A major emphasis in the Transportation Plan has been to improve traffic operation through the use of transportation system management improvements. Most of these improvements require little in the way of committed resources, and will have a high benefit for little investment. The major improvements do require substantial resources and energy commitments, but are needed for an efficient transportation system. The net result of these investments will be an energy savings.

Traffic operation will be smoother, and in general trip lengths and travel times will be shorter as a result of the improvements recommended. According to traffic assignments supplied by the Department of Highways, the implementation of all the improvements will result in an overall reduction in the vehicle-miles traveled and hours of travel. The end result is a transportation-related energy savings for the Helena community.

3. Minority and Neighborhood Impacts

The Transportation Plan has incorporated previous policies on major route designations, and proposed improvements that are still appropriate. Very little if any relocation is expected since most of the improvements will be on existing routes. No low-income or minority neighborhoods will be adversely impacted due to unnecessary acquisition of property or increased traffic levels. Participation in the transportation planning process has also been encouraged through an extensive series of neighborhood meetings held by the Lewis & Clark Areawide Planning Organization throughout the transportation planning area.

4. Improvements to Existing Systems

As mentioned under Item 2, "Energy", this Transportation Plan has emphasized low-cost transportation system management-type improvements. These improvements require little or no construction, and improve the efficiency and increase the use of existing facilities. Considering that funding for transportation system improvements is limited, this is a prudent and practical approach.

5. Consideration of Alternatives

A large number of potential improvements were identified as the Transportation Plan improvements program was being developed. These were reduced through a review and testing process to assure that the appropriate improve-

ments were being selected. In those cases where the improvement could be computer modeled, the Department of Highways tested the proposed improvement using the traffic assignment model. The final improvement plan was a result of the consideration of a number of alternative improvements narrowed to the most beneficial improvements with a practical funding program.

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